

The Iron Age

A Review of the Hardware and Metal Trades.

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Shaw's Planer Bar.

The invention herewith illustrated is designed to enable ordinary planing machines to perform the work of shaping and slotting machines, and to plane through, under, and over work through apertures, and between high projecting parts, in a thorough manner, never heretofore attempted on a planer, and excels the slotting and shaping machine, by reason of the extra length of work it will penetrate. A 5 ft. planer machine, provided with one of these bars, will plane through twenty

sents so enlarged a view of the invention, that any further details here are unnecessary to insure its comprehension.

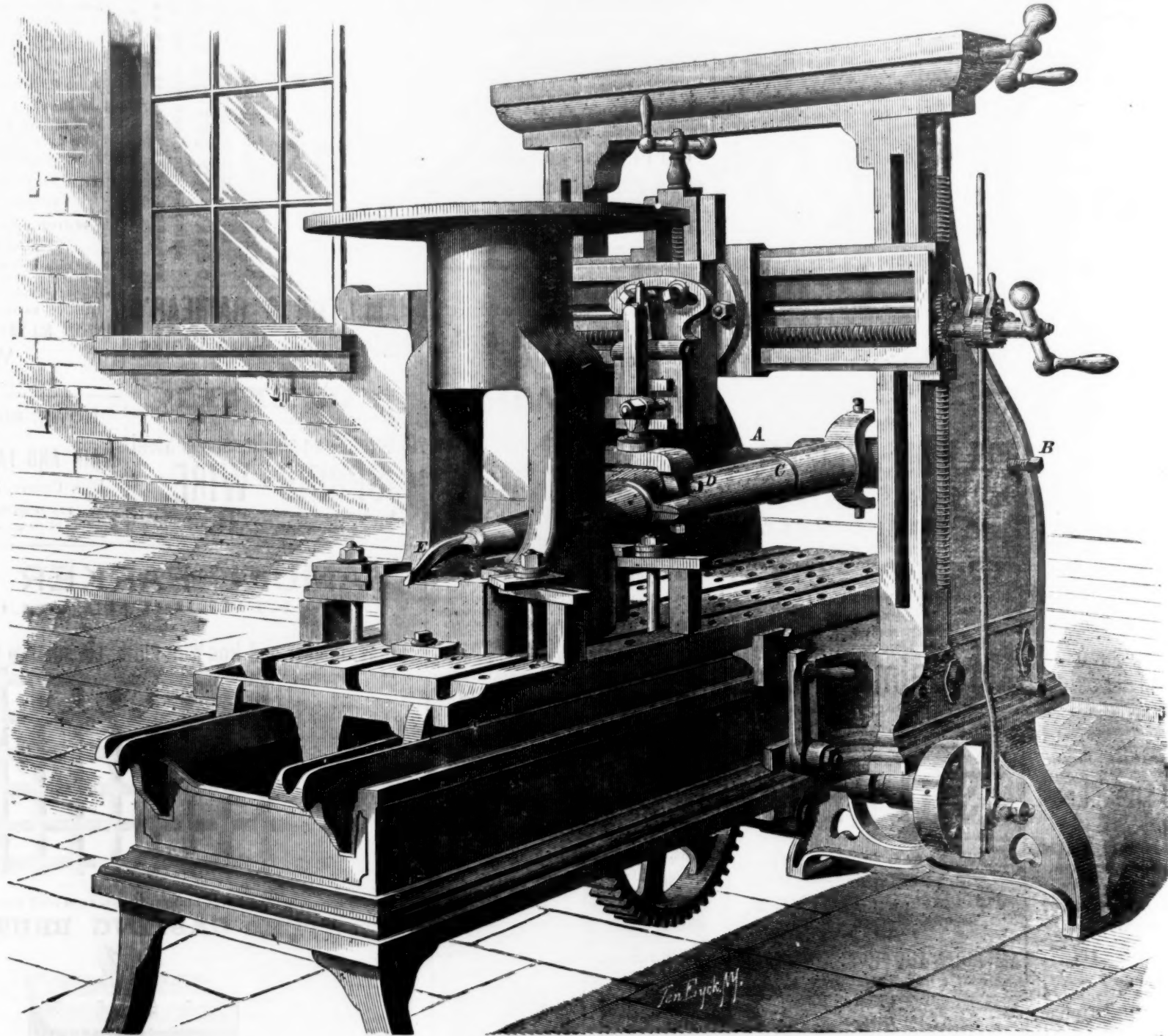
A Mont St. Bernard Tunnel.

Among the important railroad schemes now under consideration among European engineers, is a plan to carry a line across Mont St. Bernard. The projected line starts from the town of Martigny, which is a station on the Simplon line, starting from Bouveret on the shore of the Lake of Geneva, and which is now

following: At Borgeau a curved tunnel of 500 metres; beyond Bovermier, two tunnels one of 100, the other of 300 metres, the mouth of the latter being in face of the old Trappist monastery; between Sembrancher and Volleges, a tunnel 250 metres long; another of 150 metres, in the side of Mont Larecy; another of 500 metres under Comeure; proceeding on to St. Pierre it enters a tunnel of 150 metres. At an altitude of 1804 metres at the foot of the plain of Prox commences the great tunnel which carries the line into Italian territory; this tunnel is 5800 metres in length, and lies beneath the

and this is seldom employed. The average inclination of the line is 0.021, and this may possibly be reduced by two or three millimetres. The soil over and through which the work passes supplies all the necessary materials, so that great cost of transport will be avoided. This is asserted to be the case on both sides; moreover, there exist great masses of anthracite at Liddes, Fontaine-Dessus and Planardo, for fuel, while the forests afford timber for building purposes. The total cost of this work is estimated at 61,510,000 francs, or £2,460,400, the cost of the great tun-

care in making their vessels swift, safe and certain. But if, at any time, one or the other line may gain or lose the business of carrying the mails by gaining or losing its reputation for these three essentials, there will be a continued rivalry established between them that should secure better mail service for the government, and better, because safer, transportation for the traveling public. A government bounty for good service on the ocean, which consists simply of giving government business to those best fitted for the work, is free from the objections that attach to the offer of government



SHAW'S PLANER BAR.

inches, thus penetrating to a greater depth than a far more expensive shaping machine. A 13 ft. planer, provided with one of these bars, will plane through four feet of work. It will operate on a long or short stroke, and the ordinary feed of planer controls the feed of bar.

In brief, the planer bar will reach through work on planing machines, and thus serve to perform a large proportion of the labor of slotting and shaping apparatus, at, of course, a materially decreased expense. It consists of a heavy shaft A, which rides upon centers B. On this shaft the bar C is pivoted; so that by this mode of connection a universal joint is obtained, and the outer end of the bar rendered capable of motion in all directions. Near the center of the bar is a pivoted box D, from which a pin projects, which is securely fastened to the tool post and carriage. The bar is, therefore, subject to the movements of the latter, and is regulated by the ordinary feed motion of the planer. At E the tool end is represented as operating on the inside of a wide casting.

It is claimed that the ability of the device to reach through work is unlimited, and that it will plane one-third the length of the planer; while its action being of an end-thrust character, it will cut all that the machine is able to pull without chattering. Our illustration pre-

advertised for sale by auction by the Swiss authorities, passes by the valley of the Rhone, and reaches the northern flank of Mont Chemin at Charrat, it then passes along the southern flank of the Borgeau, enters the valley of Bagne opposite Sembrancher, and follows the same slope of the mountain as far as Champsec, where it crosses the valley, and turns the northern flank of Mont Larecy, proceeds as far as Sembrancher, and then enters the principal valley of Entremont, and passes along the right side by Chamolle, La Roziere, Reppay, Fontaines-Dessus, Liddes, Alev, and St. Pierre, gains the plain of Prox, where commences the northern end of the tunnel which debouches at the same altitude in the valley of Menouve. From this latter point the line turns the flank of the hill above Etroubles and St. Oyen, inclining toward St. Remy, and traverses the Combe der Bosses till beyond Chulle, where it traverses the valley of the Bosses, and returns on the right side to Etroubles. From this place it runs nearly parallel to the road from Aoste to St. Remy, and descends by Guio and Arpouille; it then enters the valley of the Doire, passes above Ponte d'Aviso and Clut, and traversing the river near Villeneuve, arrives at Aoste by the right side of that valley. The total length of the line is nearly 134 kilometres (77 miles English.) The most important features of the plan are the

Col de Menouve; over the 2400 metres on the Swiss side the ascent is 0.0048; then follows a level distance of 1100 metres, and a descent of 2300 metres on the south side, with an incline of 0.005. It is proposed to construct this tunnel in four sections, by means of side galleries, so that the work may be completed in three or four years. These working galleries will remain open afterward for ventilation and other uses. A peculiar feature is that it is proposed to form a station within this tunnel by widening 600 metres of this level, central portion; one of the objects which has led to this singular plan is, that possibly for economy sake two light trains which had made the ascent separately might be joined together for the descent on the other side. It is also argued that with such an arrangement many tourists would be glad in the summer season to attain the summits of the group of the Grand St. Bernard by the inclined passages already referred to, and at the mouths of which stations for refreshment, and even for lodgings, might be established. The principal works, after quitting the great tunnel, on the Italian side are: A tunnel below St. Remy of 430 metres; ten kilometres further on a second tunnel 300 metres long, and a third at the Gorge de Cluze 200 metres. The declivity on the Italian side is equal to 0.022. The minimum radius employed for the curves is 300 metres,

nel being set down at 17,000,000 francs, or more than one-fourth of the sum total. The connection of Aoste with the Italian lines of railway at Ivree and Santhia is set down at a further sum of 28,500,000 francs, making a grand total of 90,000,000. The projectors devote two long chapters to the question of traffic and consequent profits, but it is not necessary to enter upon this part of the subject, at least at present. The *Monitore delle Trade Ferrate* says that the Prefect of Turin has made a report on this project in the Provincial Council of Turin, expressing a strong opinion in favor of it, and declaring it to be his opinion that the government and the Parliament, seeing the consequence of such a line to the Province of Turin, will be inclined to carry it into execution at any cost.

Ocean Mail Contracts.—The Philadelphia *Ledger* says: The decision of the Postmaster General, that he will make no contracts for the carrying of ocean mails, but will give the business to those steamers which best fulfill the conditions of speed, safety and certainty, is practically the offer of a government premium for good steamships and good seamen ship. When contracts are made with one or more steamship lines for definite periods of time, neither the lines carrying the mails nor those without contracts are thereafter incited by the hope of mail subsidies or freights to

premiums in other forms, because it approaches more nearly the ordinary practices of business men.

Important Mining Experiment.—A series of important experiments have been arranged by Her Majesty's Inspectors of Mines, for the purpose of testing the practical value of a French invention known as the aerophone, or the Denayrouze mining apparatus. By means of this, and encumbered with a weight of no more than eight or ten pounds, it is said that a man may penetrate at once and to a great distance into a pit filled with choke-damp, or with smoke, or with any gas of whatever nature or density, remain there for several hours, carry a lamp with him without danger, and have free use of his arms. The aerophone has already been tried in the principal mines of France, Germany, Belgium, and Switzerland, and its first trial in England has been arranged to take place in the Wigan coalfield, and the well known fiery nature of the mines in that district, which has been the scene of a fearful series of terrible disasters, will afford the opportunity of a really practical test. If the invention accomplishes what is claimed for it, there is no doubt its adoption would often save a large amount of property, and frequently many lives. The mine owners, at least, will have an opportunity of satisfying themselves as to its real merits.

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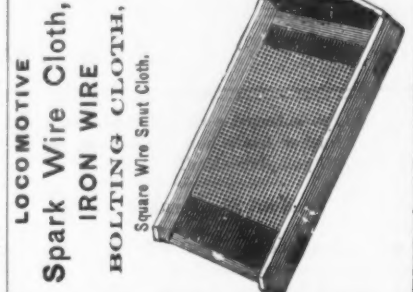
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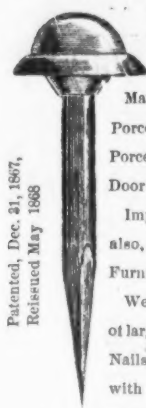
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Steel Locomotive Tires.

Rolling Sheffield Blooms in Jersey City—
The Plant and the Process.

The manufacture of cast steel locomotive
tires has grown up almost entirely, in the United
States, during the last eight years. But very few
tires date earlier than 1866. A set, however,
was put in use on the Chicago, Burlington &
Quincy R. R. in Oct., 1863. The rapidity with
which their use has been increased in this
country may be judged from the following
figures derived from the reports of the American
Railway Master Mechanics' Association: In 1863 there were sold in the United States
466 steel tires; in 1867, 8045. Up to May, 1870,
forty thousand tires had been sold, the proportion
of steel tires to those of all kinds in use
being then ninety per cent. By May, 1871,
nearly 48,000 had been sold. Their use is now
almost universal. One establishment, that of
Charles Cammel, of Sheffield, England, has
lately exported in one order to Russia as many
as 5000 tires, and from India, a country in
which we would suppose that a very limited
number of tires would be required, a single
order has been made on the same firm for 3000
tires.

The test of a locomotive tire is the number of
miles which may be traversed by an engine of
standard weight, drawing a certain load, before
the tire requires turning. The wear allowed
upon a tire before turning is considered necessary
is $\frac{1}{8}$ inch.

The report of the Committee on Steel Tires to
the American Railway Master Mechanics' Association,
at the session of 1873 presents the following,
as the results of their researches. The basis
in this case is 1-16 inch wear.

Average run to 1-16 inch wear.....	Miles.
Highest average on any road to 1-16 in. wear..	65,500
Lowest " " " " " " " " " " " " " " " "	1,16 " "
" " " " " " " " " " " " " " " "	6,403
Highest run of any single set to 1-16 " " "	74,387
Lowest " " " " " " " " " " " " " " " "	1-16 " "
" " " " " " " " " " " " " " " "	1,274

The reason for these discrepancies is partly
that the statistics are drawn sometimes from
the experience of freight engines, and some-
times from that of passenger engines, the
draught in the former case being heavy, and
in the latter, light. The engines, also, on whose
experience the records were based, were large
and sometimes small, and, in some cases, the
records are based upon the experience of en-
gines with large driving wheels, and in other
cases the engines have had small driving
wheels. No regularity therefore having been
observed in the observations on which the
statistics are founded, but little value can be
attached to them. The average English mile-
age is very much larger than that of our own
country. In India a harder steel can be used
than in this country, because the climate is
hotter, and the variations of temperature are
not so great.

The increased endurance of tires in England
may be ascribed to the facts that the trams in
that country are generally lighter, roads are
better, and there is less snow, etc. In Belgium,
the endurance of the Bessemer tire, which is
there largely employed, has been greater than
that of locomotive tires in America. In this
country, however, but few Bessemer tires have
been used, crucible steel having been the ma-
terial generally employed. Experiments are
now being made in the United States to deter-
mine the adaptability of Bessemer steel to the
manufacture of locomotive tires.

An important element in estimating the wear
of tires, is the fact that the first wear of the
tire is much the best. A statement prepared
some time ago by Mr. Hayes, of the Illinois
Central Railroad, showed that the average
mileage to 1-16 inch wear, between the first or
second turning, is from 10 to 20 per cent. less
than before turning, a difference much greater
than can be accounted for by the mere diminu-
tion of the diameter of the wheel, and perhaps
due mainly to the greater induration given to
the outer surface in the process of rolling.
As regards the life of a tire, the committee on
tires to the association from whose report we
have already quoted, although without exact
information on the subject, compute the wear
of a $2\frac{1}{2}$ inch tire to be 288,000 miles. This is
based on the supposition that the average mile-
age between turnings is 12,000 miles, and that
the tire may safely be worn down to a thickness
of 1 inch.

Mr. W. Bailey Lang, of this city, has exten-
sive works in Jersey City for rolling tires from
cast steel blooms received from Messrs. Chas.
Cammel, of Sheffield, Eng. The blooms are
round or annular in shape, similar to the tire,
but very much smaller and rougher. Thus, for
instance, a tire 60 inches in diameter by $5\frac{1}{4}$
inches in width and $3\frac{1}{2}$ inches in thickness, is
spun from a bloom from 24 to 30 inches in
diameter. It is the weight, however, and not the
diameter of the bloom which regulates the
diameter of the tire. The width of the tire
does not vary in the process of rolling, and from
a bloom of a certain weight tires of various di-
ameters may be rolled, the thickness of metal,
of course, decreasing as the diameter of the tire
increases. The blooms vary in weight from 500
lbs. to 1300 lbs., and few are over 30 inches in
their interior diameter.

Tires of only 25 inches diameter have been
rolled, although this size is very exceptional;
and tires are seldom rolled of a diameter
greater than 66 inches. The bloom from which
is spun a tire 60 inches by $5\frac{1}{4}$ inches, by $3\frac{1}{2}$
inches, weighs, before rolling, 1160 lbs., and in
rolling loses about 5 per cent. of its weight.

Plain blooms for plain tires (i. e. tires without
flanges) are generally smaller than flange tires,
the width being usually from 6 to 7 inches. A
greater thickness of metal is also allowed in
such tires. The storage room required for the
tires in this establishment covers four city lots
100 feet by 100 feet, this large space being
necessary because the blooms are never piled
up, but always stood upon their edges.

The stoke furnace, the furnace for heating

the blooms, and the boiler, are arranged next to
each other on one side of the shop in which
the rolling is carried on. The flames from the
stoke furnace pass through the heating furnace
and thence under the boiler. A fire is also kept
directly under the boiler, but by the arrange-
ment just described a large saving of fuel is
effected. The best Cumberland coal is used
for this furnace, and while the works are in
operation about 21 tons are consumed per day.
The heating furnace is twenty inches high. The
boiler is one of Leslie's patent, nominally 150
horse-power, although as much as 450 horse-
power is frequently employed during the roll-
ing of a tire, which usually takes about five
minutes, and during this time the pressure of
steam is frequently reduced from 90 lbs. to 40
lbs. The bloom remains in the heating furnace
from $1\frac{1}{2}$ to 2 hours, and is heated to a tempera-
ture just short of that required for welding.
The tire mill, which is just opposite the heating
furnace, is provided with a small windlass to
the axle of which is attached a chain. When
the bloom has been sufficiently heated it is
grappled by a long rod, terminating in a hook,
and the rod having been secured to the chain
just mentioned, the latter is wound up on the
windlass, drawing the bloom out upon rollers
in front of the furnace. A large crane then
grapples the bloom, and swinging around,
deposits it in its proper place upon the mill.

THE BED PLATE

of this mill is an enormous block of cast iron
weighing 13 $\frac{1}{2}$ tons. It required eight horses
to draw it from the ship to the mill, and, by its
weight, broke through the upper timbers of
the dock and cut the street pavements on its
way to the works. The machinery is driven by
a pair of direct acting horizontal engines, each
of which has a 30 inch bore and 36 inch stroke.
The fly-wheel is of solid cast iron 11 feet in di-
ameter and weighs 7 tons 6 cwt. It makes 120
revolutions per minute. The fly-wheel shaft is
of steel, and 12 inches in diameter, and upon it
is keyed a pinion 22 inches in diameter. A
wheel 55 inches in diameter situated upon the
main shaft gears into the pinion and multiplies
the power $2\frac{1}{2}$ times. The main shaft is of
steel and 11 inches in diameter. It passes from
the engine room through a heavy brick
wall, and at its extremity a large bevel gear
wheel is keyed to it. The greatest diameter of
the latter wheel is 50 inches, and face 12 inches.
This wheel gears into a similar horizontal
wheel above it keyed upon a vertical wrought
iron shaft 10 inches in diameter. The latter
shaft has three bearings, one at the foot im-
mediately under the roll, and one over the roll;
to the upper portion of this shaft is attached
the main vertical roll.

At this point

THE FOUNDATION

may be best described. The machinery rests
immediately upon a brick substructure. The
bed plate, which is situated upon the ground
floor, is supported by two heavy brick walls,
which enclose a room upon the floor below, in
which are located the bevel gear wheels just de-
scribed, and other machinery. The latter ma-
chinery, and the engines, rest upon a basis of
brickwork which, with the walls, constitute a
solid brick foundation, extending down $4\frac{1}{2}$ feet
below the floor of the engine room, the base of
the brickwork being below the water level. Nearly
90,000 bricks were employed in building this
foundation. Below the brickwork is a grillage
of wood, consisting of two tiers of beams, each
two feet thick, the beams in each tier running
at right angles to those in the other, and above
both is a flooring of six inches of timber, mak-
ing a wooden basis four feet six inches in thick-
ness. This all rests on a foundation of piles.
From the bed plate proceed rods seventeen feet
long to the bottom of the wooden grating on
which the brickwork rests. When the mill is
started the whole foundation trembles as one
mass, and the tremor can be distinctly felt for
a considerable distance from the works.

The foot of the main vertical shaft, to the
upper extremity of which the main pressure
roll is secured, bears upon a foot plate, which
is secured in

A HEAVY FOUNDATION PLATE,
weighing from 2700 to 3000 lbs. Originally the
foot plate was secured directly to the brick-
work, but the jarring of the machinery was so
great as to loosen it from its place. The heavy
casting was therefore prepared and sunk in the
brick work, and the foot plate bolted to it.
This casting is six inches deep, five feet long
and three feet wide. It is secured to the founda-
tion by heavy bolts, which extend through
the brickwork to the bottom of the wooden
substructure. Behind the shaft of the main
pressure roll is a heavy casting, which acts as a
brace to the bearings of the shaft. It is a huge
flange plate $2\frac{1}{2}$ inches in thickness, placed
against the rear walls and provided at its foot
with lugs 20 inches wide, which extend into the
side walls 10 inches. The whole weight of the
casting comes upon these lugs. To insure a
still greater degree of strength it is secured to
the rear wall by bolts running through the lat-
ter, which is five feet thick.

THE MOVABLE PRESSURE ROLL
is carried by a heavy movable arm or bracket
weighing some two tons. This arm is sup-
ported by the bed plate and slides backward
and forward in grooves upon its lower surface.
This motion is communicated to the arm by a
gear wheel and screw feed, the latter being
about five inches in diameter. Power is trans-
mitted to the gear wheel by a belt and double
pulley, but the speed of the arm can be varied
and the direction of its motion reversed by
means of a lever and chuck.

When the bloom is ready it is deposited upon
the bed plate around the moveable roll. The
machinery is then started, and this roll begins
to move toward the main or stationary roll, as
soon as the bloom is gripped between the two
rolls it begins to revolve itself, stretching out
farther and farther upon the bed plate as its
diameter increases. It is prevented from wab-

bling by the pressure of two arms or wings,
which are supported by a shaft fixed to the bed
plate, and which swing inwardly toward the
main pressure roll. Each arm has in its face a
groove or opening, the sides of which are pro-
vided with rollers. The arms are swung around
to and from the pressure roll by means of a
wheel and worm feed, and require the attention
of the superintendent of the operation, who al-
ways stands at the wheel. When the rolling
begins the faces of these arms are brought around
to bear against the tire, which enters the opening
or groove in the face above described. As the
tire expands the arms are caused to recede by
the person in charge at the wheel, to permit
this expansion. The tire rests upon the lower
roller of the opening, which allows the tire to
revolve without friction, while the upper roller
of the opening bearing down upon the tire pre-
vents its swelling. The face of the tire also
bears against a roller in the rear of the opening,
so that little or no friction is created. The
shape of the latter roller is such as to accommo-
date the flanged surface of the tire. The com-
bination of three rollers is the patent of Mr.
Wm. Harris, who has charge of the rolling
operation in these works. Formerly but one
roller was used upon each arm, the top and bot-
tom rolls just described being omitted. With-
out the use of such rolls the upper and
lower sides of the tire are apt to be uneven
and require subsequent turning, on account of
the irregularities in the hammering of the
bloom, in the first instance. By the aid of this
device, however, one is able to roll the upper,
lower, inside and outside faces of the tire sim-
ultaneously.

During the rolling of the tire a jet of water is
kept constantly playing upon the interior sur-
face of the main roll, and one upon the interior
surface of the pressure roll. A stream of water
from the hose is also kept playing upon the tire.
When the operation is nearly completed the
work is stopped for an instant in order to strike
the name of the maker, etc., upon the tire,
after which the machinery is again started and
the operation completed.

To determine when the tire has reached the
proper diameter, a measuring apparatus is em-
ployed. It consists of a rod, to one end of
which is attached a shorter rod at right angles
to the other. The workman thrusts the shorter
rod into a hole in the movable pressure roll so
as to bring the main rod over the tire and par-
allel to the upper surface of the bed plate. A
slide is fixed firmly on the rod at a point pre-
viously determined. Another slide is moved up
and down the rod inside of the tire. The latter
slide carries a little horizontal wheel, and as
the tire increases in diameter the slide is moved
so as to keep the wheel constantly against the
interior surface of the tire, which causes the
wheel to revolve whenever it touches it. At
last, when the tire has expanded sufficiently, the
movable slide reaches the stationary slide and
the operation is stopped, the tire having at-
tained its proper diameter. In determining the
proper point at which to fix the stationary slide,
the inside diameter of the tire must not only be
considered, but also the thickness of metal to be
obtained and the amount of shrinkage which
takes place in cooling.

The diameter of the pressure roll and of the
main roll each vary for the different widths of
the tires. The main roll is held down in its
place by a sleeve upon the main shaft (which
also acts as the top bearing of the shaft), and
a cap which is screwed down upon the shaft.

To change the roll, the cap and then the sleeve
must be hoisted from the shaft, and then the
roll itself is hoisted and removed and another
substituted in its place. This operation gener-
ally takes about fifteen minutes.

A BLOCKING MACHINE

is sometimes used when the tyres are not per-
fectly true when taken from the rolls. It con-
sists of four quadrants, which are laid together
in such a manner as to form a wheel, outside
of which the tyre to be blocked is laid. When
placed together there is also a conical hole at
the interior of the circle, provided with a screw
thread. A screw corresponding in shape to the
hole is then inserted in it and screwed down,
forcing the quadrants apart and correcting all
irregularities in the tire.

Various methods are employed in

SETTING AND FASTENING TIRES

upon their wheels. The majority of roads
shrink the tire upon the wheel, as in the case
of tires for ordinary wheels. Others, in addi-
tion to shrinkage, use set screws. Some use
set screws alone. Some put the tire on with a
bevel on the wheel, and secure it by bolts pass-
ing through the tire and the wheel, with a grip
head on the outside and a nut on the inside.
As regards the amount of shrinkage, a large
proportion of roads shrink the diameter of
their tires 1-100 inch for every foot of the di-
ameter of the tire.

In the preparation of

THE BLOOM

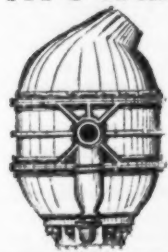
the piece is cast solid, with a slight protuber-
ance around one edge corresponding to the
flange of the tire. The blooms are then heated
to a very high temperature in a furnace, and
a conical hole punched through the center. The
metal is then turned over and a larger conical
or taper punch driven in the hole on the other
side, widening it. The sides of the hole then
resemble the frustrums of two cones joined
together at their smaller bases. The bloom is
then placed upon an anvil and hammered until
the hole is nearly cylindrical. The outside of
the bloom is also beaten into shape by trip-
hammers.

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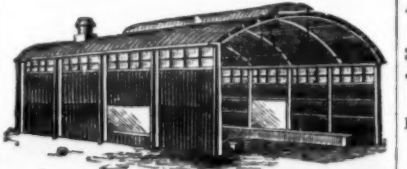
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SECOND FLOOR

New Patents.

We take from the records of the patent office at Washington the following specifications of certain patents lately issued, which will be found interesting:

IMPROVEMENT IN ROTARY PUDDLERS.

Specification forming part of Letters Patent No. 144,416, dated November 11, 1873, issued to William Sellers, of Philadelphia, Pennsylvania, and George H. Sellers, of Wilmington, Delaware.

This invention comprises, first, improvements upon the invention for which Letters Patent No. 134,234 were granted to William Sellers under date of March 5, 1872; second, additional inventions as adjuncts of said improvements; and, third, a novel means for charging molten metal into the puddling vessel, and for removing the puddled ball therefrom.

vessel, A, is supported at its closed end upon a traversing frame, G, by the journal, e, and stand, D, and at its open end by the steel tire, e, resting upon the two wheels, k, k, the journals of which are in the frame, G. The traversing frame, G, is supported upon three points, viz., the pintle, H, resting and vibrating in the step bearing, and the two wheels, I and P, the axes of which are placed radially to the pintle, H, upon which it traverses about the step in the plate, E. The journals of the wheel, P, are placed in a box, P', which is vertically adjustable in the frame, G; and the box is secured to the frame, G, by a T-formed projection upon its side fitting into a correspondingly formed groove in the frame, which permits a free vertical movement, but prevents any lateral motion. The vertical adjustment is regulated by a screw passing through a projection from the wheel box and taking into the frame, G. The pintle, H, is attached to the frame, G, in precisely the same manner, and these features of adjustment are made so exactly alike that the positions of the pintle, H, and wheel box, P', are transposable, for a purpose that will be hereinafter explained. The wheel, I, is supported in a frame, J J, Fig. 4. The frame, J J,

The feet of the stand D, through which it is bolted to the frame G, the bolts, and their position in the feet of the stand, are respectively made so nearly alike that the position of the stand upon the frame G may be reversed or transposed. Motion is communicated from the pinion M to the wheel N. This wheel N runs loosely upon the shaft N', to which it can be clutched by the sliding collar p, carrying three pins, sliding freely through the collar p, which is secured to the shaft N'. These pins take into corresponding holes in the hub of the wheel N, Figs. 3, 3 and 4. On the end of the shaft N is a pinion, P, which gears into the wheel B, thus completing the train of wheels from the engine to the puddling vessel. The shaft N' is supported in bearings O and O', which are secured to the cross-girts l l of the frame G. Two locations for the bearings O and O' are provided upon the cross-girts l l. (See Fig. 4.) These locations are one on each side of the center line of the frame G, and equidistant from it, so that when the positions of the engine and the frame J J are reversed or trans-

posed, as provided for, the bearings O and O' may be shifted, and the wheel N will still gear with the pinion M, and the pinion P with the wheel B. The vertical adjustment of the traversing frame G is effected at its rear end by inserting packing pieces between the frame J J and the traversing frame G, but a variation of the distance between these two frames would affect the gear-wheels N and R, unless provision was made for a lateral movement of the frame J J proportionate to the vertical movement of the traversing frame. This lateral movement is produced by the radius bar m, which is attached at one end to the center, vertically, of the frame J, J, and at the other to the traversing frame. Mounted upon this shaft, and revolving freely upon it, is the bevel wheel S, which may be clutched to the shaft by a conical friction clutch operated through a grooved collar and lever. The bevel wheel S gears with the bevel wheel 8 fastened to the wheel I, thus completing the train of wheels from the engine to the wheel I, for effecting the traversing motion of the frame G. The wheels N and 8 are clutched to their respective shafts by means of a lever shaft. This shaft passes through and is supported by the frame G, and is operated by the hand lever r'. By pressing the hand lever r' in one direction, the engine will be coupled positively to the puddling vessel; and by pressing it in the other direction, it will be released from the puddling vessel, and coupled by friction to the wheel for traversing the frame, the latter movement continuing only so long as the operator continues to hold the friction clutch in gear.

The reversing valve of the engine is operated through the balance wheel t, Fig. 2; and a platform, r', is provided, upon which the operator may stand, and be carried along with the vessel, in the most convenient position for controlling the rotation of the puddling vessel or the vibration of the traversing frame. The platform r' is bolted to the under side of the frame G, and is transversely arranged, so that it may be attached in the same position upon either side of the frame. The water pipe i, which supplies the water space in the wheel B, the steam pipe j', to operate the engine, and the exhaust pipe j' from the same, are exhibited in Figs. 1 and 2.

The machinery of this apparatus is so constructed and arranged that the same machine may be readily set up, and operated to swing the puddling vessel to and from its flues, either to the right or left, indifferently, the driving mechanism operating substantially the same in either case. The apparatus by means of which the puddling vessel is charged and discharged is exemplified by Fig. 5; and consists, substantially, of two cranes, T and T', united by an iron bar, u, and wire rope, the end of this bar intended to enter the puddling vessel projecting beyond the point at which it is supported by the rope, and being formed into a fork, united across the ends of its prongs. This end of the bar can be elevated or depressed by raising or lowering the rope by which it is suspended. This crane

nearest the puddling vessel is provided with hoisting apparatus, preferably water pressure. The other crane merely maintains the end of the fork u farthest from the puddling vessel in a horizontal plane. The support for the fork u, where suspended from the rope, is such as to permit the fork to turn freely about its axis. The outer end of the fork is attached to the end of the jib on the crane T by a universal joint, which will permit the fork to turn upon its axis, and to be raised or lowered, and the crane T to be turned about its axis. The crane post T' is provided with a support v, Fig. 5, on its top, in which the bowl end of the fork u may be laid when it is detached from the rope, as shown by the dotted lines in Fig. 5. The fork, when attached to the rope, is raised or lowered by admitting water under pressure to one side or the other of a piston in the cylinder U, the direction being determined by a valve, g, operated through a lever, e, and vertical rod, z, passing up through the center of the crane post T. The connection between the lever

and the vertical shaft z should be by universal joint. The upper end of the rod z is attached to a crank-pin on the end of the horizontal shaft w, which passes through the center of the jib, and is provided with a handle, z, on its outer end. The crane being in the position shown in the drawings, the fork must be swung against the lining of the puddling-vessel, alongside of the puddled ball. Rotating the puddling-vessel slightly will cause the ball to roll on to the fork, the fork moving laterally with the surface of the lining, against which it is resting. Moving the handle z so as to raise the ball in the vessel sufficiently to allow it to pass out, it is sustained entirely by the two cranes, and by pulling upon the end of the crane jib T the ball can readily be withdrawn from the vessel, the positions of the cranes being such as to maintain the fork parallel with the axis of the puddling-vessel during its withdrawal. The handle z is then moved so as to lower the ball; and by inserting a bar in the eye of the fork-handle, the fork may be turned upon its axis so as to discharge the ball. The

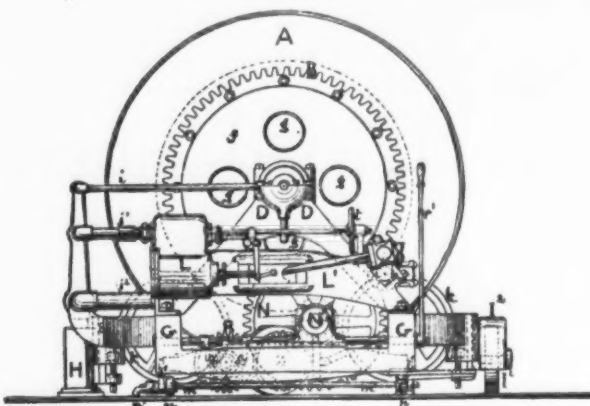
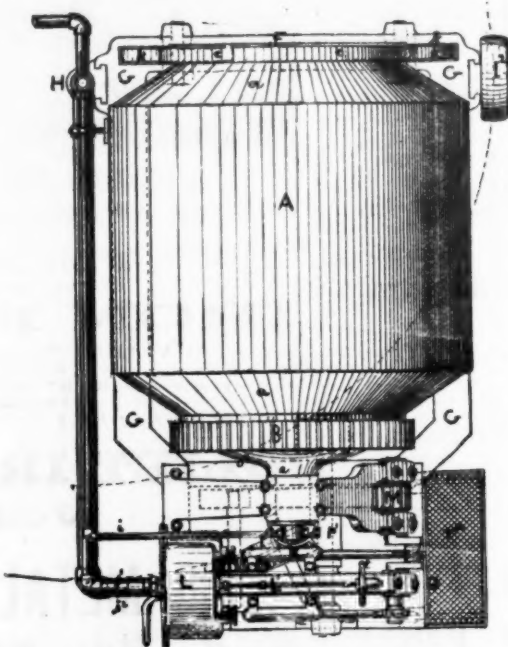


Fig. 1.



IMPROVED ROTARY PUDDLING FURNACE.—Fig. 2.

Figure 1 is an end elevation of the rotating vessel and traversing frame with the operative mechanism; Fig. 2, a plan of the parts shown in Fig. 1; Fig. 3, a vertical longitudinal section through the same; Fig. 4, a plan of the adjusting frame which supports the end of the traversing frame, with the operative mechanism; Fig. 5, an elevation of the apparatus for charging molten metal into the puddling vessel, and for removing the puddled ball therefrom.

The puddling vessel, A, Figs. 1, 2 and 3, is open at one end only; but, with a view to obtaining enlarged capacity without unduly enlarging its diameter, we make it cylindrical, with ends, a, a, Figs. 2 and 3, in the form of frustums of cones, thus reducing the terminal diameters to the size required for the opening at one end, and for the gearing attachment at the other; while, to avoid the destructive effects of expansion and contraction, we make the cylinder, with its conical ends, of wrought iron plates. The outer ends of the conical frustums, a, a, Fig. 3, are flanged or bent inward, the inner edge of this surface being turned off to make the openings at each end of the vessel of the same internal diameter, so that the cylinder, A, may be closed by the driving gear attachment, B, Figs. 1, 2 and 3, at either end indifferently, the turned edge of the plate fitting over a projection upon the gear. B, Fig. 3, for the purposes of support; a construction which further enables us to drive the cylindrical vessel by a gear wheel of smaller diameter. The interior of the vessel, A, and frustums, a, a, are provided with bars, d, d, Fig. 3, riveted to the plate, for holding the fix, or lining, C, of the vessel in place, and a circular ring, d, d, on the gear wheel, B, performs the same office for the closed end of the vessel. The rim of the spur wheel, B, is attached to its hub, e, by a spherically formed plate, f, Figs. 1, 2 and 3, having circular openings, g, g, through it, which are closed by covers, h, h, Fig. 3, cemented into place. A hollow projection, e, is formed upon the hub, e, to form a journal, which supports this end of the vessel. Attached to the rim of the wheel, B, we provide a second plate, f', which closes the end of the vessel, the space thus inclosed between the two plates being of sufficient width to admit of a water circulation, which can be maintained through the upright pipe, A, and horizontal plug, h, Fig. 3. The plug, h, is provided with two passages. The upper passage is connected at its outer end to the water pipe, i, Fig. 2, and its inner end opens into the water pipe, h, and its outer end opens into the basin, v. To the bottom of the basin, v, a pipe, p, is attached, the outlet for which is in the open vessel, P, cast with the step plate. The tire, e, is shrunk on the heavy wrought iron ring, d, d, and is further secured in place by the ring, F, and through bolts, e, e, Figs. 2 and 3. The

relieving the radial wheel, I, from the weight of the puddling vessel and traversing frame.

For the purpose of rotating the puddling vessel, A, and vibrating the frame, G, the double cylinder steam engine indicated by the letter L, Figs. 1, 2 and 3, is provided; but as the construction of this engine forms no part of the invention, it is unnecessary to describe it further.

The cylinders, crank-shaft, bearing, and guides are cast with, or securely attached to, a piece, L, Figs. 1, 2, and 3, which is provided with a foot at each end, by which it is bolted to the frame G. These feet, the bolts, and their location in the feet, are made so nearly alike that the position of the engine upon the frame G may be reversed or transposed. The stand D is widened on one side near its base, to embrace the pinion M upon the double crank-shaft of the steam engine, and bearings are formed in this stand on each side of the pinion M, in line with the bearing upon the engine frame L, making three bearings for this shaft.

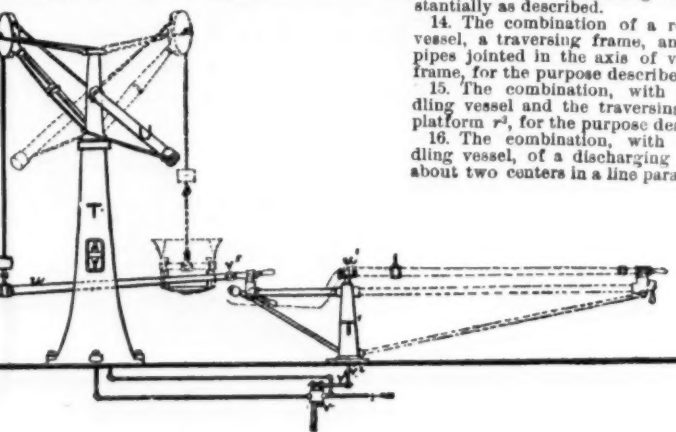


Fig. 5.

nearest the puddling vessel is provided with hoisting apparatus, preferably water pressure. The other crane merely maintains the end of the fork u farthest from the puddling vessel in a horizontal plane. The support for the fork u, where suspended from the rope, is such as to permit the fork to turn freely about its axis. The outer end of the fork is attached to the end of the jib on the crane T by a universal joint, which will permit the fork to turn upon its axis, and to be raised or lowered, and the crane T to be turned about its axis. The crane post T' is provided with a support v, Fig. 5, on its top, in which the bowl end of the fork u may be laid when it is detached from the rope, as shown by the dotted lines in Fig. 5. The fork, when attached to the rope, is raised or lowered by admitting water under pressure to one side or the other of a piston in the cylinder U, the direction being determined by a valve, g, operated through a lever, e, and vertical rod, z, passing up through the center of the crane post T. The connection between the lever

of the puddling vessel, substantially as described.

17. The combination, with a rotary puddling vessel, of a discharging fork swinging about two centers, one end moving only in a horizontal plane, the other having both a vertical and horizontal movement, substantially as described.

18. The combination, with a rotary puddling vessel, of a discharging fork having a flexible support at one end and a universal joint at the other, substantially as described.

19. The combination with a rotary puddling vessel, of a discharging fork having a flexible support at one end and a universal joint support at the other, so that the fork may be turned upon its axis, substantially as described, and for the purposes set forth.

20. The handle z, located and arranged substantially as described, so that the various movements of the fork may be managed from one and the same point, substantially as set forth.

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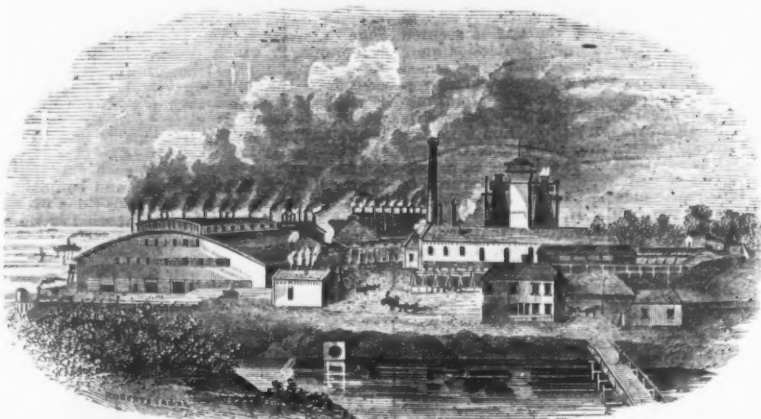
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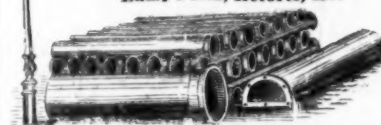
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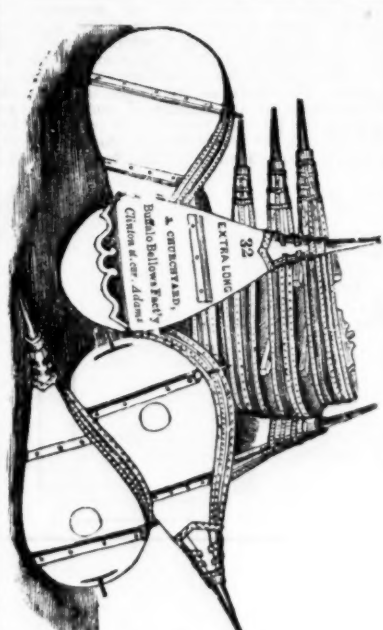
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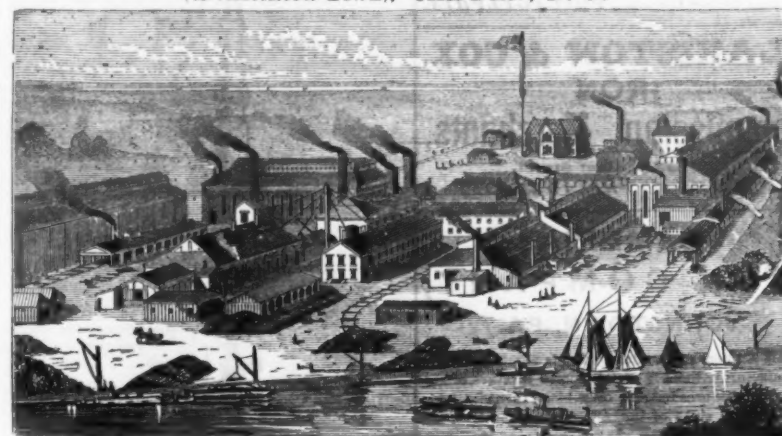
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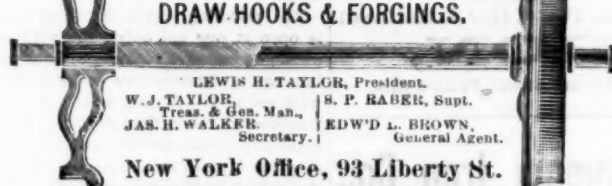
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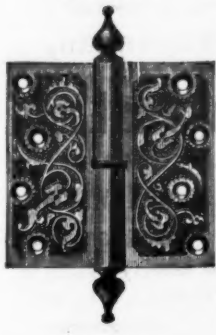
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**Nickel.**

The demand for nickel for coinage, alloys, electro-plating and other uses has so increased during the past year or two as to considerably exceed the supply, and the manufacturers of the alloy known as German silver have petitioned the Parliament of the German Empire not to still further increase the demand by the introduction of nickel money into the country. The cost of German silver, which contains about one-third of its volume of nickel, has gone up nearly \$12 per 220 pounds within a single month. The aggregate annual product of nickel (exclusive of the American product), does not exceed 600 tons, of which English industries alone use one-half. It is used in the token coinage of this country, Belgium and Switzerland, and the manufacturers say that if Germany should issue a similar coinage the supply would not be sufficient to enable manufacturers to use it in the production of cheap imitation silver ware on account of its increased cost.

Most of the nickel of the world, until within a few years, came from Germany, but the discovery of mines in America has entirely driven the foreign article from the market, and considerable quantities are now exported to Europe. But one deposit is being worked in America, and is believed to be the largest yet discovered in the world. The mine lies in Lancaster county, Pennsylvania, about three miles south of the Gap Station, on the Pennsylvania Railroad. It is on the high land separating Chester and Pequea Valleys, a region rich in minerals; for, beside the copper found in connection with the nickel, there are large deposits of iron and limestone a short distance south. The existence of copper there was known many years ago; indeed, it was taken out seventy years ago, but the mining was never prosecuted with much vigor, and afforded little profit.

The copper was impure, but about the year 1856 the material mixed with it was discovered to be nickel, and as the depth of the mine increases so it predominates. The ore is very hard, and the mining is carried on altogether by blasting. There are a few Cornish miners to take the lead, but the rest are Americans. A Cornish pumping engine of 75 horse-power draws half a barrel of water at every stroke from the mine, which is 240 feet deep, and another brings the ore to the surface. The ore, in appearance, is iron gray, very heavy, and in some pieces the bright copper ore is very prominent. The amount taken from the mine varies from 400 to 500 tons per month. The mining and manipulation of this amount requires 175 hands employed here and at the furnaces. The ore has to be hauled in wagons about half a mile to the furnaces, which is situated on very high ground, and overlooks the beautiful Pequea Valley. This situation was chosen partly that the wind might carry away the noxious smoke and gas, and partly because of the stores of limestone and flint in the neighborhood.

The process adopted is first to throw the ore between the jaws of a ponderous iron breaker, by which it is reduced to small fragments weighing about half a pound each. Thence carts convey it to the kilns, which are constructed very much like the old-fashioned lime-kilns, except that these have a very tall smoke stack, to increase the draught. A kiln, holding 80 or 90 tons, is filled with ore and kindled with a little wood. It burns about six weeks, its own gas supplying the fuel for burning out the impurities. The first step toward purification is followed by a process almost precisely similar to that to which iron is subjected. There are three large furnaces, and into these the ore is put, mixed with powdered flint and limestone (the former predominating) and coke. About three draws are made in twenty-four hours, for the work does not stop either night or day, two sets of hands being employed. The product of the furnaces is passed through iron rollers and crushed to powder, in order that it may more easily be transported to Camden, New Jersey, where the final process of separating the nickel and copper, and preparing each for the market is effected. No waste is allowed. The ore dust, large quantities of which are made in drilling and blasting, is mixed with flux and clay, baked in square bricks, and reduced in the furnaces, just as is the rest of the ore.

The pure nickel commands a high price, varying, of course, according to the demand, but averaging over two dollars per pound. Not only does this mine supply all the material for the nickel coins, but nickel is being extensively used in plating iron and other metals, and in various compounds. The whole property is owned by a Philadelphia gentleman, who has, by his energy and capital, not only opened up a new branch of industry to the American artisan, but has taken another step toward making the American independent of other nations.

The Hudson River Suspension Bridge.

The railroad bridge to span the Hudson River at Poughkeepsie, which was begun by the laying of the corner-stone a few days ago, as described in our last issue, will be a work only second in importance to the East River Bridge. The capital of the company, as authorized by the charter, is \$2,000,000. Of this sum \$1,250,000 has already been subscribed. The balance will, it is said, be made up among the friends of the Pennsylvania Railroad Company, the Philadelphia and Reading Railroad Company, the Poughkeepsie and Eastern Railroad Company, and possibly the Erie Railroad. All these companies, with the exception of Erie, are now stockholders in this new undertaking, and it is confidently expected that the Erie Road will come in. The cost of the bridge will be from \$4,000,000 to \$5,000,000. The directors are A. L. Dennis, president; George Innes, G. P. Pelton, H. G. Eastman, P. P. Dickinson, Thomas A. Scott, J. Edgar Thomson, S.

P. McCandless, Mr. Kneass, Charles G. Francklyn and D. Salomons.

According to the plans, the bridge will extend from a point on the west side of the river 350 feet from the ferry landing, and extended across at right angles to the channel, to a point on the Poughkeepsie side, between the ferry house and Shattuck Boat Club House. Four piers will be built in the river, each to be 500 feet apart, according to the provisions of the charter, and one on the shore on each side, just at the bottom of the bluff. These piers will be of granite founded on the bed rock, and will be carried up to the height of 150 feet above the surface of the river at high water mark. On these will rest the heavy iron and steel trusses, each 500 feet long and between 60 and 70 feet in height, the railroad track being on the top chord, or nearly 200 feet above the water line. The line of approach on the Poughkeepsie side will leave the river at the point, as above mentioned, and cross the top of Reynolds Hill, where a smaller pier will be placed; thence it will run in nearly a straight line, crossing Dutchess avenue and Albany street at the south corner of the same, Delafield street at a point midway between Luther Etling's house and Parker street, Tallmadge street, half way between Hoffman and Duane streets, passing over the barn of the south line of the old Gager place, now owned by Messrs. Buckingham, and crossing Washington street from the northwest corner of Gifford avenue to the southeast corner of Parker avenue or North street. All these streets will go under the track, which will be about 20 feet above the grade of Washington street at the point of the crossing. In fact, the line west of Washington street will be a continuation of the bridge itself on shorter spans. East of Washington street an embankment will take its place. From Washington street the line continues across the Fullhill at the crossing of Baldwin avenue, or where Baldwin avenue would cross if it were put through. It passes under the grade of Garden street just south of Zimmer avenue, and thence crossing the creek again, leads to the junction of the Poughkeepsie and Eastern Railroad at Hamilton street. It is under contemplation to make a depot at either Washington or Garden street, for the convenience of Poughkeepsie passengers.

The directors directed the engineer to commence the work of construction at once. The company will undertake the construction of the shore piers under the supervision of Mr. P. P. Dickinson.

The Tunnel from Dover to Calais.

The *Londard Standard* says: The French Commission for inquiry into the scheme for a tunnel beneath the English Channel assembled at the Prefecture of the Pas-de-Calais, at Arras, recently, to examine the statements sent in from the sub-prefectures and the reports of the chambers of commerce. M. Martel, Vice-President of the National Assembly, and President of the Commission, was in the chair. The Commissioners present were MM. Adam, de Clercq, Dusausy, the Baron de Fourment, Matthieu, the Marquis de Paris de Pressy, and M. de Rosamel. The Prefect of the department, the Count de Rambuteau, assisted at the proceedings. The Tunnel Company was represented by Lord Richard Grosvenor, M. P., M. Michel Chevalier, Sir John Hawkshaw, Major Beaumont, M. P., Mr. Brunles, C. E., Mr. Hawes, M. Bergeron, C. E., M. ne Gamond, C. E., M. Caillaux and M. Paris (members of the National Assembly), Mr. Edward Blount, and secretary of the company, Mr. Bellingham. The sitting lasted about three hours, and was occupied with a discussion on some of the economical and financial features of the project, the functions of the commission being to determine for or against its "public utility." Some technical questions were put, and were replied to by Sir John Hawkshaw. Mr. Arthur Brunton attended to exhibit a working model of the tunneling machine invented by his father, Mr. J. Dickinson Brunton, which had been tried on a large scale by the company at Lee's Cement Works, at Snodland, and with which, although the model works less satisfactorily than the machine itself, the members of the commission were much pleased. Mr. Low, who was one of the early promoters of the tunnel, and one of the engineers to the company at its formation, but who had lately withdrawn from the present undertaking, appeared before the commission with a sort of counter project and was heard in explanation of his scheme. (The commissioners are supposed to have ruled that, as this scheme had not been referred to them by the Minister of Public Works, they were not competent to pronounce any official opinion upon its claims. They could, therefore, only hear Mr. Low as a critic of the scheme actually before them. The commission will assemble in Paris in order to adopt its report. The Prefect and the Countess de Rambuteau entertained the representatives of the company, the engineers, and secretary at a banquet, after which the Prefect proposed as a toast: "The Success of the Enterprise" in a speech of considerable eloquence, to which Lord Richard Grosvenor replied in French.

An interesting series of experiments has been carried out in the Medway, off Chatham Dockyard, by the officers and men of the Royal Engineers, under the direction of Major E. D. Malcom, the head of the Torpedo Department at the School of Military Engineering, for the purpose of testing the merits of an invention by Mr. Mauldin Vintner for enabling divers when employed at any depth to hold conversation with those at the surface of the water. Hitherto an insuperable difficulty has been experienced by divers in being unable to communicate verbally with the attendants above, the principle usually adopted by divers being to give preconstructed signals by so many pulls

on a signal line. This, however, appears to have been at length overcome by Mr. Vintner, in the invention submitted by him to the government. In the trials just completed in Chatham Harbor, Corporal Falconer, an experienced diver of the Royal Engineers, equipped in the Siebe & Gorman improved diving apparatus (which has gained the prize medal at Vienna), made the descent, and during the whole time he was under water was enabled by means of the new apparatus to converse freely with those above every word spoken by him being distinctly heard and understood. Mr. Gorman, who was present during the experimental trials, stated that the invention would be further improved upon, so as to facilitate its use in all diving operations connected with the harbor works, and for laying stone blocks, &c., in connection with subaqueous operations. The diver signals the attendant, who places his ear to a small cone at the top of the tube, whence a message can be distinctly heard. The diver has the apparatus completely under his control, and by placing his mouth to the mouthpiece inside the helmet, and then turning a cock on the outside, can communicate instantly with the attendant. The apparatus can, it is stated, be easily applied to any description of diving dress. The value of the invention will be readily understood and appreciated by everyone interested in the science of diving, from the simple fact of the great confidence a diver will gain from being in his isolated position enabled to speak directly to those in whose hands his life for the time being is literally placed.

Shipbuilding in Maine.

A correspondent of the *Boston Journal*, who writes from Augusta, Me., under date of Dec. 13, gives an interesting and valuable record of the operations of the shipbuilders in Maine during the season which has just closed. The correspondent gives detailed statements, showing the results in all the districts of the State except Passamaquoddy, from which no returns have been received, and which last year built 26 vessels, mostly schooners, with an aggregate tonnage of 4381-51. These statements show that there have been built in the State (Passamaquoddy not included), 10 ships, 23 barks, 2 barkentines, 10 brigs, 156 schooners, 12 sloops, 13 steamers, and one propeller. This is a total of 227 vessels, the aggregate tonnage of which is \$3,659-58. The correspondent says: "It is safe to conclude from unofficial information received that the tonnage built this year in the Passamaquoddy district will not be less than 5000, chiefly schooners, so that the total number of vessels built in Maine the present year will be not less than 255, with an aggregate of \$8,689 tons, or the marvelous increase of 120 per cent. more than the tonnage built last year, with an approximate value of nearly \$5,000,000. The Bath district has built the largest amount of tonnage, with the Waldoboro' district second, and the Machias district third. In 1872 there were built in the Bath district 47 vessels, with a total of 13,557 65-100 tons. This year, 48 vessels have been built, with a total of 31,754 50-100 tons, an increase of 134 per cent. over the tonnage of last year. It has been the most prosperous year since 1856, when the tonnage of the district was about 49,000 tons, old measurement. At the present time there are on the stocks at Bath 13 vessels, two of which are ships of a total tonnage of over 12,000, which are not included in the above estimate. In the Waldoboro' district there were built in 1872 26 vessels, with a total of 6945 1-100 tons. This year there has been built 43 vessels with a total of 13,605 53-100 tons, an increase of more than 95 per cent. over the tonnage of last year. In the Machias district and in the remaining districts there is the same ratio of increase in the amount of tonnage built over that of last year, and the year will close with one of the most prosperous years in shipbuilding known for nearly 20 years. It will be observed that while there has been an increase in the number of ships built over that of last year, and for many previous years, the increase over the tonnage of last year was 66 per cent. The average of Maine ships show them to be of larger tonnage than those built in former years, scarcely a ship being constructed but what is from 1200 to 1500 tons and upward. The increase in the number of schooners built (including an estimate of the Passamaquoddy district), has been at least 50 per cent. over the tonnage of last year. Three-mastered schooners are fast superseding other kinds of vessels. They are built cheaper, and consequently there is more profit in their construction. The larger number of these schooners built in the Bath and Waldoboro' districts will average from 300 to 600 tons each. The indications are that the general prosperity in Maine shipbuilding will be continued another year, and that there will be an increase in the number of large vessels over those built this year."

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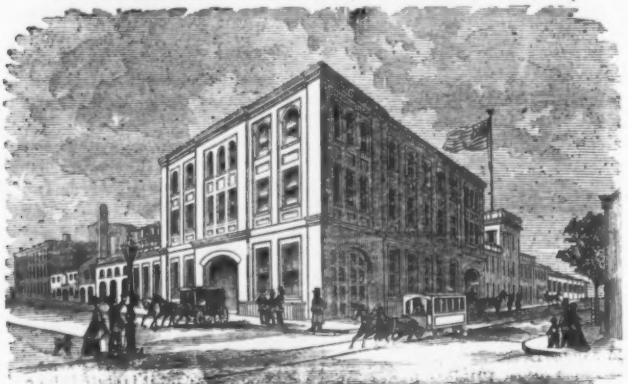
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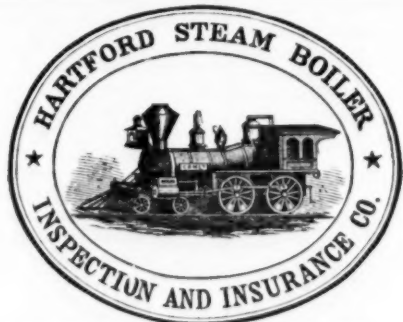
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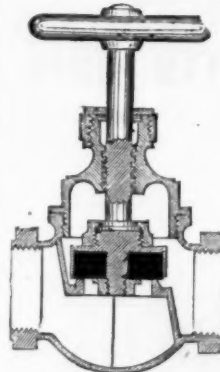
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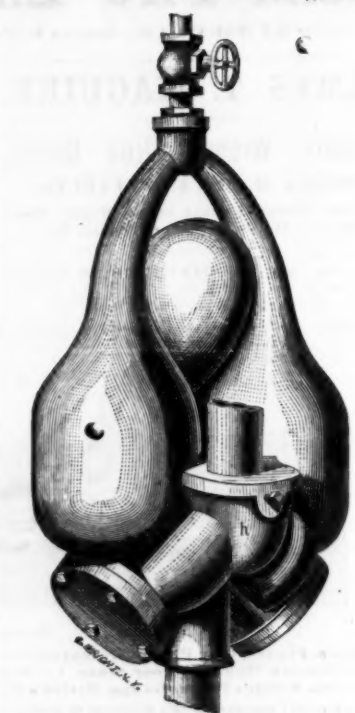
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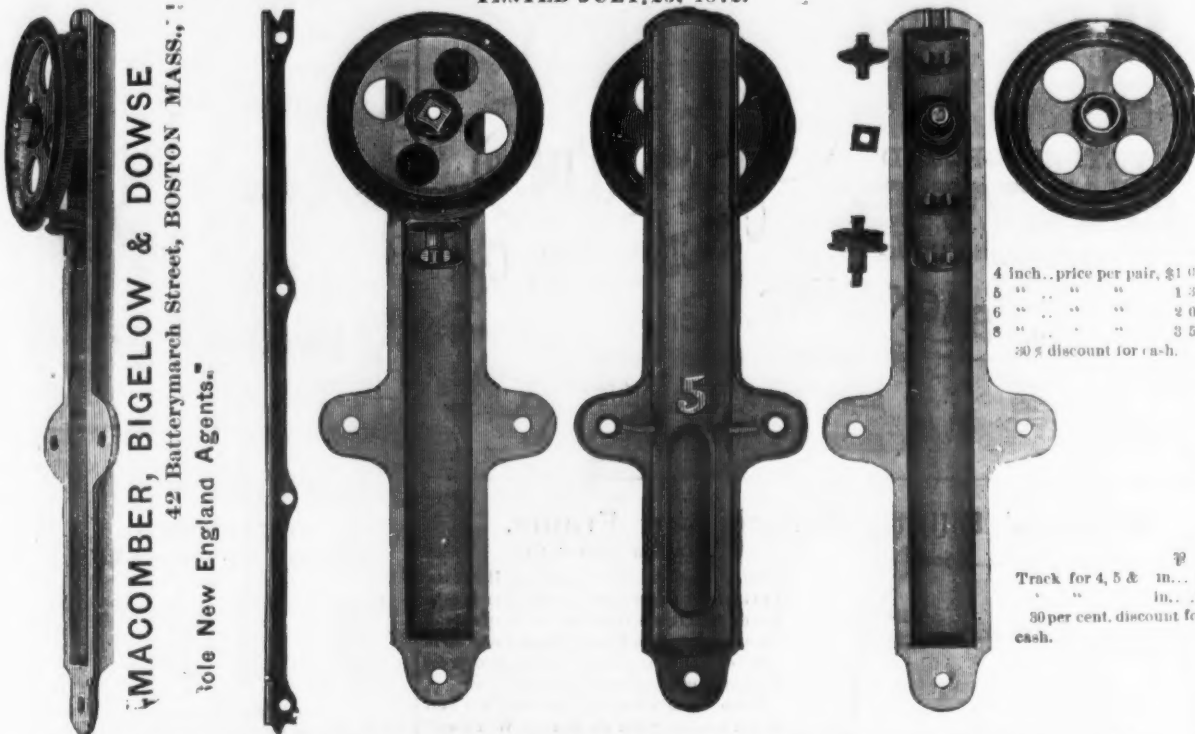
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PHILADELPHIA, Dec. 29, 1873.

"The year of the panic," as 1873 will be long remembered, draws to a close, and ere this is in print, your paper will bear date of 1874. A retrospect, although strictly in order at this writing, is not a very pleasant operation, for to few, in or out of trade, has the year borne out its promise at the beginning. Iron, which, under every known rule, should have continued active at the opening prices, declined materially in the early summer, and long before the annual panic arrived, a crisis in the iron market had occurred. We had every reason to expect a continuation of railway building when this industry suddenly ceased, and with it the demand for all the various items of equipment. When the panic came, the only result admitted on all hands was the complete and continued prostration of the iron trade, and yet in less than sixty days after the first suspensions a more active demand existed for pig iron than had ruled since the early months of the year. During the last month of the year more iron has been sold, and almost exclusively for consumption, than in any similar period of any year since the war. 1873 has been a year of anomalies; upsetting the best laid plans of both manufacturers and jobbers; inciting to enterprise and production by flattering promise, and disappointing and disheartening in result; threatening wide and protracted depression, and reviving at the close into unwonted activity, with a more hopeful promise for 1874. While recording the vagaries of fortune during the period referred to, it will be well to note the benefits which are likely to accrue to us from these changes. These are many, and will result in radical changes. The price of labor has been generally reduced from 10 to 20 per cent., and now bears a more reasonable ratio to the price of the product. Ores have materially declined, but not sufficiently to justify the expectation of a low price for iron in 1874, or, indeed, as much as they may do before the real business season opens. Railway construction has been temporarily stopped, and to the general benefit, as the roads heretofore to be built will be absolutely required and built upon a proper money basis. New enterprises have been forbidden by the scarcity of capital, and for the present will be confined to those which must be successful, because of actual demand. Much valuable mineral property, held for investment and speculation, has been forced upon the market, and will pass into the hands of those who will develop it speedily. Speculation is, for the time being, prohibited, and the best efforts of our business men are turned to providing for the financial future of the country. All these positive benefits, arising from the generally accepted disasters of the year, indicate to every thinking man the certainty of a prosperous and growing trade for the period before us. Remembering the lessons of 1873, will enable the industrial community to establish by 1876 a system of business prosperity which will surpass that of any previous period.

The week has been given up to holiday preparations and enjoyments, and there will be little of business to note before the new year is in. The strike of the engineers and firemen on the Western roads managed by the Pennsylvania Co., shows how completely the railroad companies and the traveling public are at the mercy of a few. The organization of this strike was more complete than any heretofore attempted, and extended over a great territory, causing serious interruption to business and loss of time to passengers. The locomotive engineers would appear to have very little cause for this strike, inasmuch as the ten per cent. reduction of their wages simply returns them to what was the rate previous to last spring, and still leaves them earnings of from \$3.80 to \$4.50 per day. In view of this fact, all the pretty resolutions adopted at the meeting of the Brotherhood of Locomotive Engineers, held here last fall, become simply buncombe. These resolutions deprecated strikes as the last resort to be adopted, and stigmatized them as a relic of barbarism. With the number of skilled mechanics at present out of work, it will not be difficult for the companies to supply the place of the strikers, and the opposition must result in loss to them ultimately, but it would be a good time to adopt some rules which shall henceforth insure the certain running of trains independent of any brotherhood or other union.

The Pennsylvania Railroad Co. announces a reduction of ten per cent. on all salaries and wages, great or small, on and after January 1, 1874. No difficulty is expected with the men, but arrangements have been made to prevent any delay should strikes occur.

The statistical tables of imports will of course be given elsewhere in your columns when issued, but the Telegraph gives the leading figures. These are very remarkable in some instances, as showing a decrease which was unexpected. Bar and rod iron shows a wonderful decline, there being only 22,689 tons imported for the eleven months of 1873 ended Nov. 30. This is less than the product of any two of our large works, while many single mills, such as the American Iron Works, of Jones & Laughlin of Pittsburgh, or the Phoenix Iron Co., of Catsaugua N.Y. Co., or the Mahoning Iron Works, of Brown, Bonnell & Co., of Youngstown, Ohio, can any of them exceed in their annual product the total importation of their specialty. Railroad iron shows 177,965 tons for 1873 against 441,074 tons in same time 1872, and will not be 200,000 tons for the year, or not to exceed the combined capacity of the rail mills of Ohio alone, and much less than those of Pennsylvania. The total of broad rolled iron, which includes sheet, boiler and ship plate, hoop, etc., only reaches 17,988 tons, which is less than two average mills will make here in a year. The total of rolled iron imported for the eleven months, and which cannot be increased by ten per cent. for the full year, is only 228,632 tons, or say 250,000 tons for all 1870. This is less iron than would keep the car works of the country supplied, to say nothing of other industries. The pig iron imported, actually 99,028 tons, is not, in round numbers, five per cent. of our production, as estimated for the year. Under this showing we need scarcely quarrel about competition from abroad, when a very moderate reduction in our prices, equal, say, to present prices for iron, for the whole year would have prevented the importation of any. Hereafter we will, at least, supply our own iron trade, and can look for export markets with some confidence. When all this has been done, with the richest and most suitable regions of our country entirely undeveloped for the iron manufacture, we may surely hope, without boasting, to supply the world with good and cheap iron before the close of the present century.

An arrangement is reported between the American Steamship Company and the manager of the Red Star, Liverpool Line, which will give us a weekly steamer from this port to Liverpool at once, and on the completion of the two new five thousand ton steamers of the latter company, a semi-weekly line. When this is inaugurated the Antwerp steamers, and a proposed line to Bremen,

to be started in 1874, will give almost a daily steamer out of this port. In this connection, the Ohio, of the American line, made on her last trip out the best time ever made between this country and England by any vessel carrying a similar amount of cargo, and nearly equaling the fastest time made with light steamers. The Illinois is expected to beat this time, and surpass in speed any steamer out of New York.

The feature of the week, outside of Christmas, has been the official figures of the assets and liabilities of Jay Cooke & Co., which give a more hopeful showing than was at first supposed possible. Mr. Cooke claims that if he had been allowed to manage the settlement, he could have paid in full and realized a handsome fortune for each of the partners.

The following report of the coal trade shows its actual and prospective condition very fairly, and includes the figures for the year:

Some anxiety is manifested in regard to the course of the trade next year—the disposition of the product, the selling prices, and the method of selling it; but in view of the unimpaired strength of the "combination" and the reports of a further movement toward the consolidation of the mining and carrying interests, there can be but little doubt that the business will be conducted the ensuing year as it has been conducted during the past year.

It is announced that all the collieries worked by the Philadelphia and Reading Coal and Iron Company have suspended for the balance of the year, and the presumption is a large number of others, also, as the orders on hand were generally supplied. The trade may therefore be considered as virtually suspended from the Schuylkill region, so far as shipments to Port Richmond are concerned, and will hereafter be confined to the wants of the line, and those markets reached by the cars during the winter season.

The next business to come up will be the settling of the basis question for 1874. A meeting of the coal operators is being held to-day at Lyceum Hall, Pottsville, for the purpose of consulting together and taking action on the subject. The Miners' and Laborers' Benevolent Association is also discussing the question in their organizations, and after these preliminary discussions committees will be appointed to confer on the basis. As far as can be learned, the operators generally will demand for a reduction of at least 10 per cent. on contract work, with a minimum basis at \$2.50, and leave day's work the same as at present, on a basis of \$2.75.

Miners and laborers, on the other hand, are perfectly willing to continue the present basis for 1874 without any material alteration. We have not learned of any disposition manifested in any quarter to reduce the basis below \$2.50 for coal for contract work, and \$2.75 for day wages, as all consider these prices low enough for coal. Until the basis question is settled there will, of course, be but little coal mined except for immediate wants, which must be supplied.

In connection it is stated that the Associated Companies propose reducing the opening prices of coal on board vessels at the shipping points next March ten cents below the rates at which they opened last March, to correspond with the ten per cent. reduction already made in the wages of employees in the transportation department.

Among the more important provisions of the Mining Act, which goes into force in the British Provinces on the first day of January next, are the following: The limitation of the hours of labor below ground of boys under twelve years of age; the prohibition of single shafts; the forwarding to the Department of Mines of accurate returns; the reporting of all accidents; the keeping of correct plans of the workings; and weighing of at least one-tenth of all the coal on which royalty is payable.

The New York Lighthouse Exchange has fixed the following prices for January, 1874, on board vessels at Elizabethport, Port Johnson, and Hoboken:

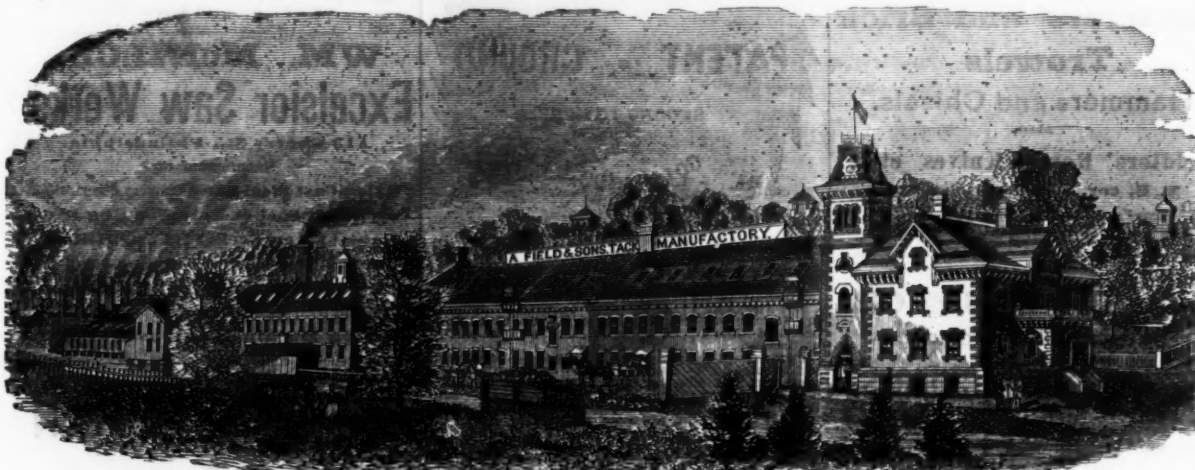
Lump.....\$2.75 Stone.....\$2.85
Broken..... 5.70 Chestnut.....\$2.15
Rags..... 5.70

These are the same prices that prevailed during the months of November and December, and will be maintained up to the first of March, when the spring reductions will be made to the lowest point, to be followed by monthly advances for the shipping season up to December, after which they will remain stationary until the following March.

The following is a complete summary of the coal trade for the week, with the total for the present year up to date, and the increase or decrease as compared with the corresponding period of last year, the figures being taken from the Pottsville Miners' Journal of to-day:

Asphalt.	Week.	Year. Inc. & Dec.
P. & R. R. R.	3,993,895	220,743
Schuylkill Canal.	748,796	494,391
Val. R. R. East.	3,139,024	129,028
Val. R. R. North.	485,494	134,515
L. & S. R. R.	1,849,595	311,655
Lehigh Canal.	736,252	430,843
Schenectady.	2,125,351	
Schenectady North.	12,716	910,584
Penna. Coal Co.	20,929	1,358,353
Penna. Canal Co.	7,928	18,750
D. & H. Cal.	1,358,353	
D. & H. R. R. East.	15,463	413,173
D. & H. R. R. West.	9,536	922,067
D. & H. R. R. South.	850	166,783
Penna. Canal.	350,710	436,860
Shamokin.	7,827	634,280
Short Mountain.	589	4,711
Lykens Valley.	317	17,070
Big Lick Coal.	217	107,755
Williamstown.	3,905	287,232
Total, 1873.	108,701	19,063,194
Total, 1872.	61,298	18,285,140
Increase An.	170,999	778,054
Bituminous.		
Broad Top.	9,349	459,539
Belt & Ohio R. R.	26,771	1,441,616
Ches. & Ohio Canal.	3,311	641,169
Penna. Extension.	3,242	107,511
Tyrene & Pa. R.	11,336	663,640
Lehigh Valley.	28,046	61,996
Total.	54,000	3,281,598
All kinds, 1873.	225,008	22,345,092
All kinds, 1872.	177,435	21,011,518
Inc. all kinds.	47,573	1,333,774

Alterations at the Blochhorn Iron Works.—The plate rolling department of this extensive establishment is to be completely reconstructed. Messrs. Miller & Anderson, the engineers to whom the contract has been given, have received instructions to take out the friction cone gearing, which was adapted to the plate mills last year for effecting the reversing action by Mr. Graham Stevenson, and regarding which a great degree of interest was manifested by the Iron and Steel Institute on the occasion of their meeting in Glasgow about a year and a half ago. They are to adapt the ordinary friction clutch to the Blochhorn mills in lieu of the friction cones. In the meantime the two largest plate mills are to be altered, and the other two will ultimately be subjected to the same process of alteration. Of course, largely-wheels will be necessitated by this new arrangement. They will be supplied by the Blochhorn Iron Company themselves.



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Dear Sirs: The experience of a year proves that your Furnace Elevator is superior to all others in use. We have in the six weeks from December last, 18th inst., made 2724 tons, 1401 lbs. Pig Metal, or an average of near 65 tons per day, which required the elevator to lift 72 feet high 4 1/2 tons Ore, Coke and Limestone for each ton of metal produced, or more than 11,500 tons material in the 6 weeks. The largest yield in one day was 312-4 tons iron, involving the lifting of 54 1/2 tons material in 24 hours. This has all been done to our satisfaction, and that, too, in the coldest weather we have had. Other furnaces with water and pneumatic hoists have experienced great difficulty, on account of the water freezing in the tanks; and in the case of the air hoists, we understand that two furnaces, not far from us, had to "blow out," from being unable to hoist stack during the "cold snap." The difficulty, we are told, was caused by the condensed moisture in the blast freezing to the sides of the cylinders, so that the piston could not move up or down.

Very truly, yours,

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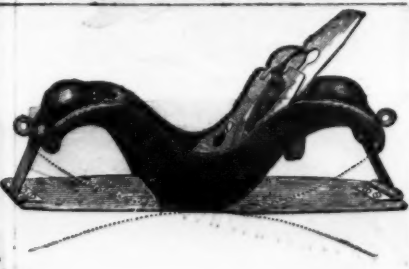
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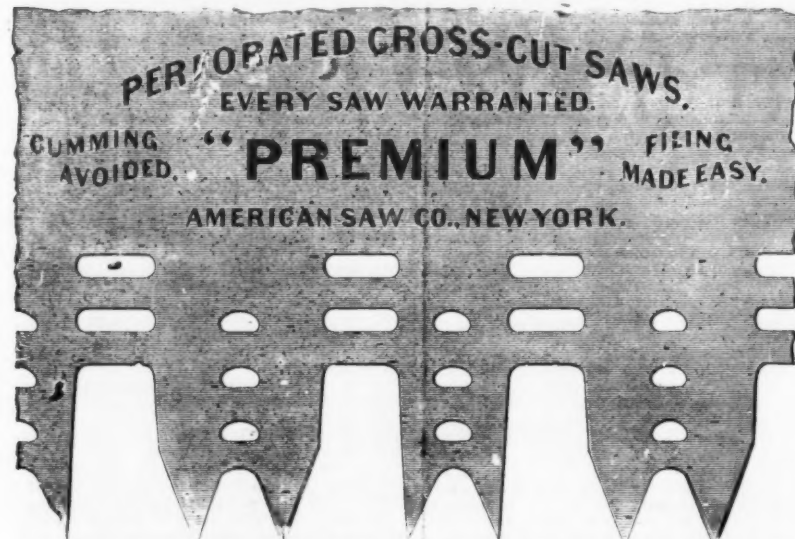
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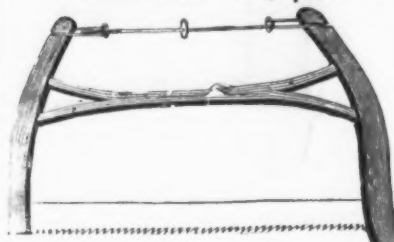
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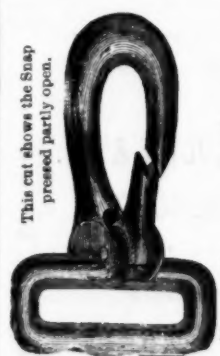
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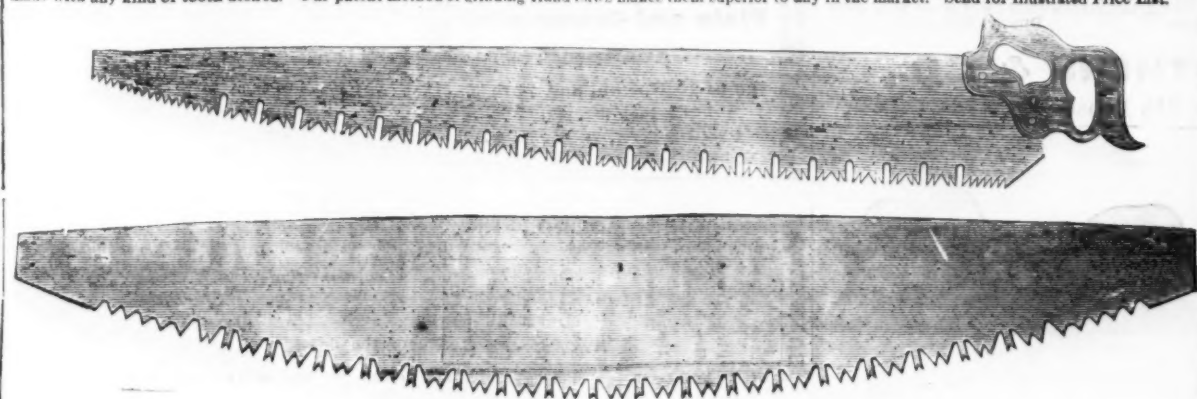
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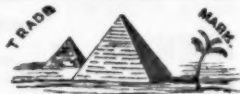
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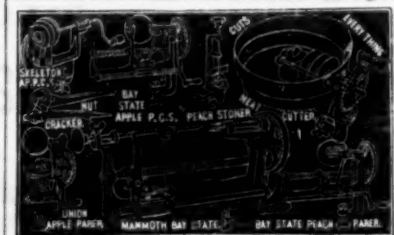
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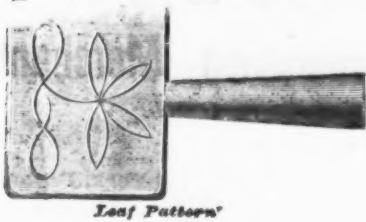
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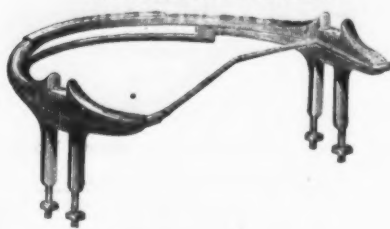
Leaf Pattern.

King Bolt Yokes.



Established 1850.

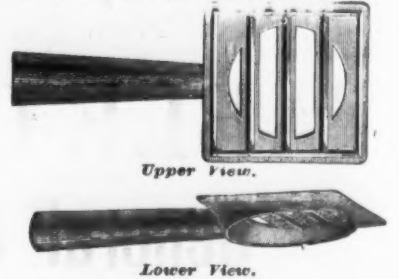
No. 6 Fifth Wheels.



1871 Pattern Shaft Couplings.

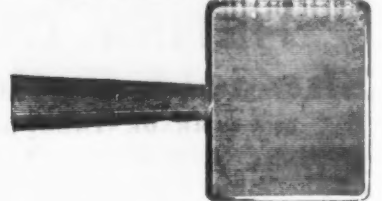


Patent Cross Bar Steps.

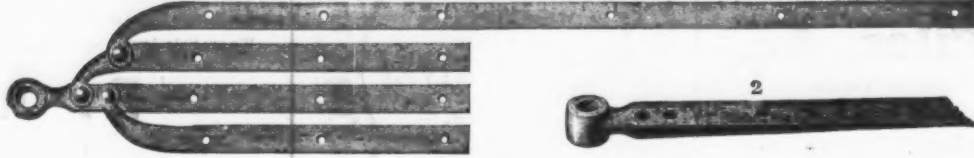


Lower View.

Solid Plain Pattern Steps.



Smith's Improved Philadelphia Pattern Slat Irons.



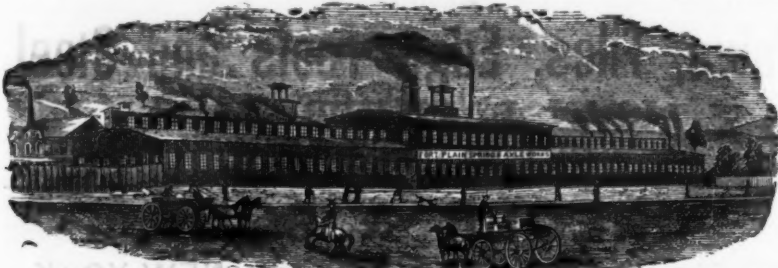
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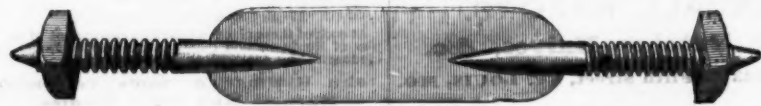
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Bonnell, Botsford & Co., Youngstown, O. 4
Burdett & Lovell, 70 and 71 West, N. Y. 4
Cleveland, Brown & Co., Cleveland, N. Y. 4
Coddington T. B. & Co., 25 Cliff, N. Y. 4
Conklin & Huerst, 25 Cliff, N. Y. 4
Fuller, Lord & Co., 138 Greenwich, N. Y. 4
Fuller, Dana & Fitz, 110 North, Boston. 4
Gardner Wm., 515 Grand, N. Y. 4
Kimball Bros. & Co., Chicago, Ill. 4
Harrison & Gilson, 508 to 502 Water, N. Y. 4
Hart G. A., 228 Walnut, Phila. 4
Jackson & Chase, 228 and 226 Front, N. Y. 4
Judson B. F., 457 and 459 Water, N. Y. 4
Matthews Chas., 123 Walnut, Phila. 4
Packard & Co., Youngstown, O. 4
Pettie & Mann, 228 and 226 South, N. Y. 4
Pittier John F., 331 Water, N. Y. 4
Stevens W. C., 34 Broadway, N. Y. 4
Pope Thos. J. & Bro., 292 Pearl, N. Y. 4
Quincy John W., 36 William, N. Y. 4
Richards E. D. W. & Co., 22 Mangan, N. Y. 4
Smith Gam' G. & Co., 342 Pearl, N. Y. 4
Warner A. B. & Sons, 26 and 28 West, N. Y. 4
Williamson James & Co., 69 Wall, N. Y. 4
Whitney Alfred R., 56 Hudson, N. Y. 4
Iron, Manufacturers of.
Bushong & Co., 31 Beekman, N. Y. 4
Britica, Middleton Works, Middletown, Conn. 4
Burden Iron Works, Troy, N. Y. 4
Cleveland Rolling Mill Co., Cleveland, O. 4
Coe & Co., 501 E. 1st, Boston. 4
Ellis W. R. & Co., 17 Battery, Boston. 4
Everson, Graft & Macrum, Pittsburgh, Pa. 4
Jones & Langhish, Pittsburgh, Pa. 4
Leonard John, 451 and 451 West, N. Y. 4
Lynchburg Iron Works, Lynchburg, Va. 4
Milwaukee Iron Co., Milwaukee, Wis. 4
Niles Iron Co., Niles, O. 4
New Haven Rolling Mill Co., New Haven, Ct. 4
Old Dominion Iron & Nail Works, Richmond, Va. 4
Oxford Iron Co., 410 Walnut, Phila. 4
Phoenix Iron Co., 410 Walnut, Phila. 4
Tale Lock Mfg. Co., 100 Broadway, N. Y. 4
Steeling Iron and Railway Co., 2 Pine, N. Y. 13
Iron, Swedish, Importers of.
Joseph Wm. & Sons, 91 and 93 John, N. Y. 23
Walden Nils, 98 William, N. Y. 23
Page Ewd. & Co., Boston, N. Y. and Phila. 4
Lace Leather, Manufacturers of.
Stoyle Wm. H., 438 Library, Phila. 10
Lanterns, Manufacturers of.
Dietz R. & Co., Tubular 54 and 56 Fulton, N. Y. 32
Howard & Morse, 45 Fulton, N. Y. 32
Shepard Sidney & Co., Buffalo, N. Y. 21
Lawn Mowers, Manufacturers of.
Chadborn & Coldwell Mfg. Co., Newburgh, N. Y. 23
Lead and Tin Lined Lead Pipe, etc., Mfrs.
Colwell Lead Co., 213 Centre, N. Y. 3
Locks, Manufacturers of.
Billings & Spencer Co., Hartford, Conn. 9
Chapin Machine Co., New Hartford, Conn. 31
Frat & Whitney Co., Worcester, Mass. 31
Rollstone Machine Works, Fitchburg, Mass. 31
Sellers Wm. & Co., 167 Hamilton, Phila. 31
Watson Andrew, 37 Dickinson, Phila. 31
Whitehill, Smith & Co., Newburgh, N. Y. 23
Wood Thomas, 208 Wood, Phila. 31
Machine Screws, Makers of.
American Screw Co., Providence, R. I. 15
Lyon & Fellows Mfg. Co., Williamsburg, N. Y. 15
Machinists.
Demarest, Joyce & Co., Brooklyn, E. D. 9
Machinist's Tools, Makers of.
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Blundell Henry & Co., Providence, R. I. 23
Freeland Tool Works, 555 and 560 W. 4th, N. Y. 31
Harrington Edwin, 15th and Pa. ave., Phila. 31
Lincoln Geo. S. & Co., Hartford, Ct. 23
Har Tool Co., Providence, R. I. 23
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Carr, Crawley & Devlin, 307 Arch, Phila. 6

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Crane O. O., 24 John, N. Y. 2
Crane H. & Co., 111-13 Lake, Chicago, Ill. 2
Gregg H. L. Co., 108 Walnut, Phila. 13
Phelps, Dodge & Co., Cliff, bet. John & Fulton, N. Y. 2
Pope Thos. J. & Bro., 292 Pearl, N. Y. 4
Quincy John W., 36 William, N. Y. 4
Thompson A. A. & Co., 213 and 215 Water, N. Y. 2
Van Wart & McCoy, 43 Chambers, N. Y. 2
Metalurgists.
Britton J. Blodgett, 289 Walnut, Phila. 34
Drown Thomas M., 1123 Girard, Phila. 24
Henderson James M., 30 Broadway, N. Y. 24
Maynard & Van Rensselaer, 21 Cliff, N. Y. 24
School of Mines, E. 9th, N. Y. 24
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Carter H. & Sons, 230 Pearl, N. Y. 23
Monuments, Granite and Bronze.
Nelson Fine Art Foundry, 315 E. 25th, N. Y. 6
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Smith L. A. & Mechanic at, Newark, N. J. 14
Non-Stopper, Rollers of.
Rowland Wm. & Harvey, 945 Beach, Phila. 32
Note Broker.
Gallaudet F. W., 3 and 5 Wall, N. Y. 2
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Arms, Bell & Co., Southfield, Conn. 14
Baker Hermann & Co., 101 Duane, N. Y. 11
Carpenter David, 402 Water, N. Y. 4
Clark Bros. & Co., Middletown, Conn. 12
Eveler, Lord & Co., Broomton, N. J. 4
Haskell W. H. & Co., Pawtucket, R. I. 14
Lewis, Oliver & Phillips, Pittsburgh and N. Y. 14
Plumb, Burdett & Barnard, Buffalo, N. Y. 14
Rhode Island Nut Co., 11 Warren, N. Y. 14
Sternberg J. H., Reading, Pa. 14
Others, Makers of.
Am. Saw Co., 1 Ferry, N. Y. 13
Ore Crushing Machines, Makers of.
Blake Crusher Co., New Haven, Conn. 30
Paints and Oils, Dealers in.
F. W. & Co., 117 Fulton, N. Y. 14
Patent Adjusting Elbow.
Sargent, Greenleaf & Cole, 300 Broadway, N. Y. 24
Patent Sockets.
Lawson & Son, Phila. and Washington, D. C. 25
Leggett & Leggett, Washington, D. C. 6
Whitney J. A., 128 Broadway, N. Y. 25
Picture Nails, etc., Manufacturers of.
Foster & Co., 17 Murray, N. Y. 8
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McNab & Harlin Mfg. Co., 36 John, N. Y. 8
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Pancost & Maule, 221 Pearl, Phila. 8
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Sandusky Tool Co., Sandusky, O. 26
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Ohio Tool Co., Columbus, O. 7
Sandusky Tool Co., Sandusky, O. 7
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Colgate Robert & Co., 25 Pearl, N. Y. 25
Corbell Lead Co., Buffalo, N. Y. 25
Jewett John & Sons, 121 Front, Phila. 25
Lewis John T. & Bro., 37 Chambers, N. Y. 25
Union White Lead Co., 26 Burling Slip, N. Y. 25
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Philadelphia Wire Works, N. 3th, Phila. 25
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E. A. Woods Machine Co., 91 Liberty, N. Y. 32
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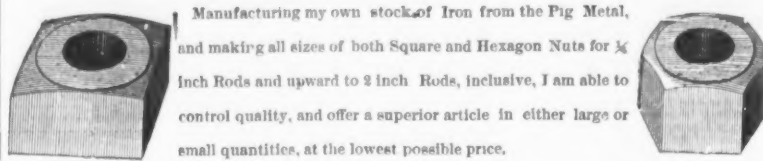
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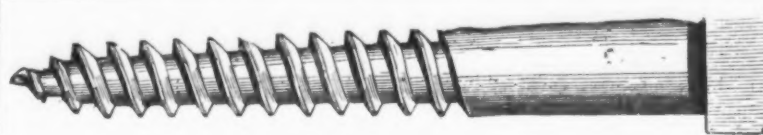
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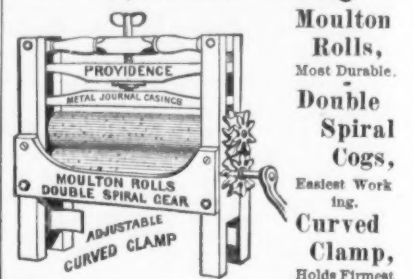
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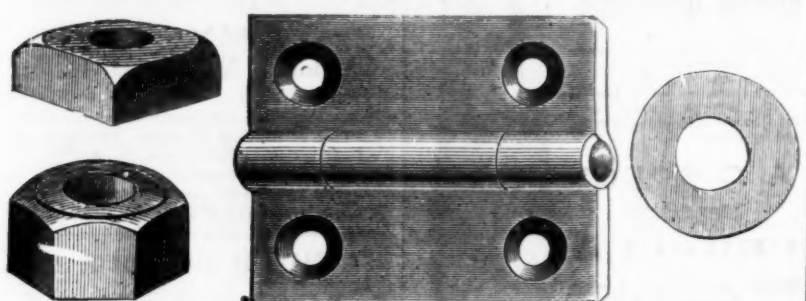
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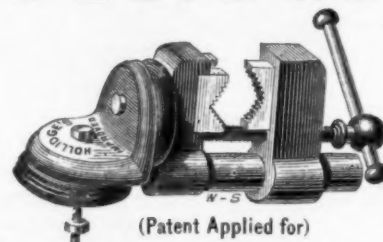
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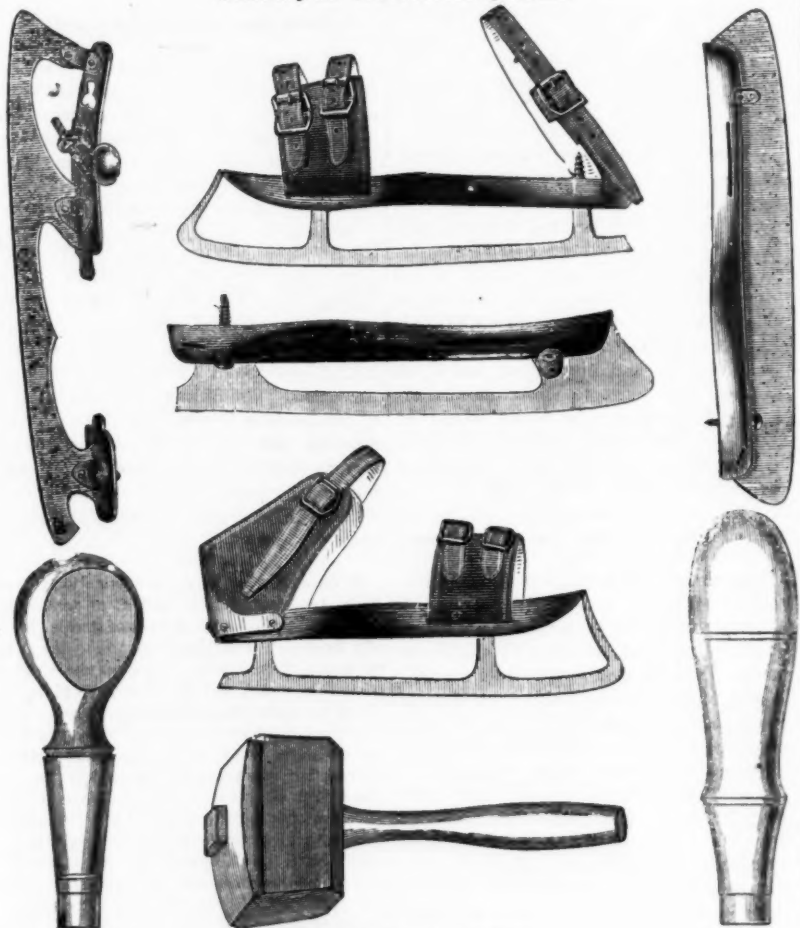
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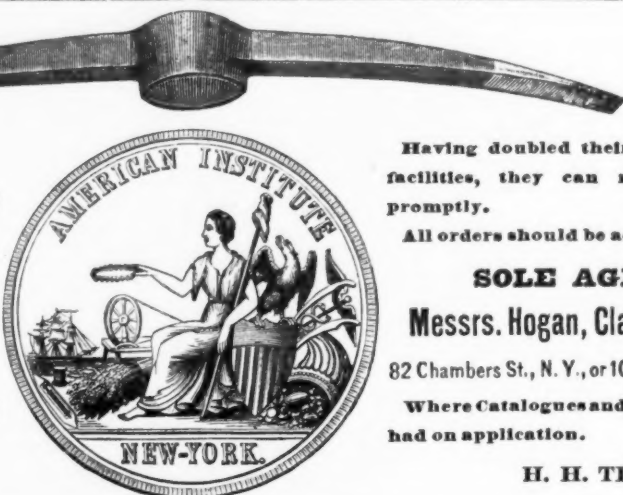
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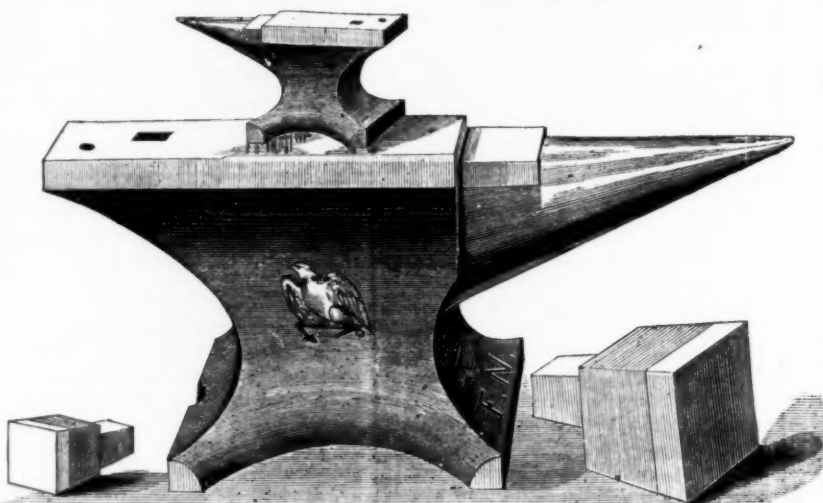
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The Iron Age.

New York, Thursday, January 1, 1874

DAVID WILLIAMS, Publisher and Proprietor.
JAMES C. BAYLES, Editor.
JOHN S. KING, Business Manager.

The Iron Age is published every Thursday morning, at No. 10 Warren Street, New York, on the following terms:

SUBSCRIPTION.
Weekly Edition \$4 a year.
Issued every THURSDAY Morning. Contains full Trade Reports for the week, brought up to the close of business on the previous day.
Semi-Monthly Edition \$2 a year.
Issued the First and Third THURSDAY of every month. Contains a full Review of the Trade for the previous half month.
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City Subscribers will confer a favor upon the Publisher, by reporting at this office any delinquency on the part of carriers in delivering *The Iron Age*; also, the loss of any papers for which the carriers are responsible. Our carriers are instructed to deliver papers only to persons authorized to receive them, and not to throw them in hall ways or upon stairs; and it is our desire and intention to enforce this rule in every instance.

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Volume XIII.

With this issue we begin Volume XIII of *The Iron Age*. During the past year our efforts to make this journal of present interest and permanent value to all branches of the iron and hardware trades and industries have been encouraged by generous appreciation and liberal patronage. We know that we have made many friends; we hope that we have lost none; and we enter upon the new year with the assurance that capital and labor are well invested when employed in improving *The Iron Age* and enlarging its opportunities of usefulness.

We have but few promises to make for the future. The value and influence of a trade journal depend, not upon what it claims to be or what it means to become, but what it is and has been for a period long enough to command public confidence. The editorial and business management of *The Iron Age* will, in future, conform to the same policy which has successfully guided its course in the past, and we shall continue to improve it whenever we may see the opportunity for so doing. We shall always be pleased to assist inventors and manufacturers of useful articles or improved methods in bringing their inventions to the notice of the iron and hardware trades, and shall continue, without regard to the cost it involves, our illustrated department of New Patents; but in the future, as in the past, we shall have no space in our reading columns to sell to any one at any price. With this brief prospectus we wish our readers a happy and prosperous new year.

The Course of the Iron Trade in 1873.

A careful retrospective examination of the course of the iron trade during the past twelve months, shows it to have experienced some startling and most unexpected changes. What these changes have been our readers already know; what causes have been instrumental in bringing them about, and to what extent the mine and furnace owners are responsible for the extreme depression of the trade during the last five months of the year, may be found to afford material for profitable discussion.

The close of 1872 found the iron trades enjoying an unduly stimulated and unhealthy prosperity. During that year the discovery was made that the world was consuming more iron than it produced, and that the exports to non-producing countries had been maintained by a reduction of stocks in the British markets to such an extent that foreign countries drawing their supplies from Great Britain were nearly, if not wholly, dependent upon current British production at a time when the British makers were compelled to draw heavily upon other countries for ore supplies and, to a less extent, for coals. The consequence of this discovery, made at a time when enormous quantities of iron were needed to supply the consumptive demands of all countries which had caught the spirit of progress and had undertaken extensive systems of public improvements, was to rapidly advance the price of iron everywhere. In this country the maximum was reached at \$56 to \$57 for No. 1 foundry pig iron during the last week in August. From July 15th to November 15th the price ranged mostly between \$53 and \$55, but began to decline in the last week of November, and the market closed with the end of the year at \$48. During the first week of 1873 the market experienced a further decline, and No. 1 iron was fairly quotable at \$45. Not satisfied with this price the makers held out for \$50 for No. 1, when \$40 @ \$42 would have met the views of buyers, and in acting upon the determination to resist the inevitable decline they made a mistake. Instead of making concessions to buyers to encourage sales, and thus affording a basis for a gradual advance during the year, they held all the iron they could not sell at their own prices. We saw the danger of such a policy early in the year, and had our advice been more generally heeded a great deal more iron would have been profitably sold, and it would not have been necessary to stop production in order to afford opportunity for the reduction of stocks. In our issue of February 27th, we said: "There is evidently a 'strong and well organized movement' among makers, at least in the East, to 'maintain the artificial condition of affairs' now prevailing; and while their efforts 'may be attended with temporary success, they cannot fail to be followed, sooner or later, by a reaction, from which those who 'are now seeking to continue the effects' of last year's iron panic will suffer first and most heavily in a present forced 'economy of consumption, and a rapid increase of production under the stimulus of high prices.' This prediction has been fully realized. The makers succeeded in keeping prices well up until midsummer, when, with consumption restricted within the narrowest possible limits, and buyers unwilling to purchase beyond their immediate requirements, the makers made the concessions which, had they been made earlier, would have induced trade. As it was, they were made too late, and with the tendency of prices steadily downward, from causes which compelled the makers to unload as rapidly as possible, no one wanted to buy. By the middle of August makers were glad to take \$45 for prime Lehigh brands of No. 1, and most furnaces were living upon their make of foundry iron, and piling up mill irons, which could have been had in abundance at \$35 to \$38. The stocks of pig iron in makers' hands was at this time very heavy, and the trade was thus placed in a position to suffer heavily from the falling off in the consumptive demands of the railroads. After reaching a consumption of nearly 800,000 tons per annum, railroad building received a sharp check. Rails accumulated at the mills, and orders ceased to come in, or were offered on the condition that payment should be taken in securities which, considering the state of the market, could only have been negotiated at a sacrifice. It is useless to deny that much of this depression resulted from the mistaken policy of the makers in holding iron above its value, at a time when the market, if left to itself, would have settled down upon the basis of a general and healthy activity. They may plead, in excuse, that the ore miners compelled such a course by fixing the price of good ores at a figure which secured to them the lion's share of the profits of iron production; but

had the furnace men allowed the price to decline naturally and easily from the extreme figures reached in 1872, and permitted the year to open at a price under \$45, they would have had it in their power to compel a proportionate decline in ores. So matters continued, with the market heavy and depressed, and furnaces either going out of blast or piling up pig iron, until the panic came which administered the coup de grace to iron making for 1872. The combined influence of the general stoppage of railroad building and the financial panic, would have been very depressing to the iron trade, no doubt, and the last quarter of the year would have been dull and generally unprofitable to iron makers and manufacturers; but the trade had relapsed into a comatose state months before, and when the panic came there was but little remaining vitality to extinguish. This is, in brief, the record of the year. Makers and ore miners will not have difficulty in drawing therefrom a very useful lesson, if they are disposed to do so. The following table, showing the monthly range of prices for No. 1 iron in this market, is compiled from our files for 1873:

	Highest.	Lowest.
January	\$48 00	\$48 00
February	50 00	48 00
March	50 00	48 00
April	50 00	48 00
May	50 00	48 00
June	48 00	46 00
July	47 00	45 00
August	46 00	44 00
September	44 00	42 00
October	40 00	37 00
November	38 00	35 00
December	35 00	31 00

The make of pig iron in the United States for 1873 cannot now be accurately determined. Early in the year we estimated it at upward of three millions of tons, but the depressing influences above noted have cut off a very large percentage of production for the last half of the year. Returns of actual production, received by Mr. James M. Swank, Secretary of the American Iron and Steel Association, show the make of pig iron for the first six months of the year to have been 1,393,075 tons of 2000 pounds. The total production for the year, which has been estimated with exceeding care from returns of all but about twenty furnaces in the United States, made by lessees or proprietors long enough after the panic had begun to afford an opportunity for judging to what extent it would affect production, gives the following results:

Charcoal	net tons,	530,749
Anthracite	"	1,349,673
Bituminous coal and coke	"	\$5,834
Anthracite coal and coke	"	48,000
Past and charcoal	"	1,600
Charcoal and bituminous	"	1,728
		2,685,434

This shows a falling off, as compared with the ascertained production of 1872, of less than 135,000 net tons. The ascertained and estimated production of manufactured iron for 1873 is given as follows:

Merchant bar and rod	net tons,	400,000
Sheet and plate	"	250,000
Hoops	"	30,000
Nails and spikes	"	200,000
Axles	"	100,000
Rails—iron and steel	"	850,000

Total rolled iron	"	1,830,000
Product of forges and bloomeries	"	50,000
Cast steel	"	28,000
Bessemer steel	"	140,000
Siemens-Martin steel	"	3,500

These statistics are given on the authority of Messrs. Swank and Baker, the latter well and favorably known to our readers and the trade as Secretary of the Eastern Ironmasters Association. They are based, so far as possible, upon actual returns of production, and are, presumably, as accurate as they can be made at this time. What amount of iron has gone into actual consumption cannot be estimated until we can form something like a correct idea of the stocks remaining in makers' hands and store at the end of the year.

Of the outlook we can only say that it is full of promise. The trade was so seriously depressed when the panic came that it could not be much injured, and it has recovered with more rapidity than was thought probable. Owing to the very general suspension of active operations at the furnaces, opportunity has been afforded for the reduction of stocks, and from such information as we can gather, they are now very light. Foundry irons have not accumulated at any time, mill irons are already becoming scarce, and it would be difficult, at least in the East, to fill any considerable orders for gray forge. The mistake of the iron trade this season has been in underestimating the consumptive requirements of the country. When trade was dull and least profitable, and makers were bemoaning the fact that the country was producing more pig iron than it could consume, we took the ground that we were making no more iron than would be wanted for home consumption before the end of the year; and notwithstanding the extraordinary check placed upon consumption by the panic, our prediction has been completely verified. We hear of many mills resuming on actual orders, and it will not be long before the scarcity of pig metal will compel the now idle furnaces to go in blast to supply the requirements of the

market. Everything points to a busy and prosperous year. Of the prospects of the immediate future we shall speak more fully in a future issue.

The Cost of Iron at Furnace and Mill.

On the opposite page is published a table of unusual interest, showing the average cost, for a series of twenty-three years, of pig iron on furnace bank and bar iron at mill, compiled from original data by Mr. Wm. E. S. Baker, of Philadelphia. Owing to the very considerable fluctuation in the cost of labor and materials during the past two years, it has been considered advisable to tabulate 1872 and 1873 by themselves, and we are desired by Mr. Baker to note the fact that the figures for these years do not include any reservation for extraordinary contingencies, such as damage by fire, water, or explosion, nor do they include freight and selling charges, nor interest on capital, all of which practically increase the cost of production. It is also important to note that the estimates are based upon the cost of making iron at furnaces and mills favorably located. The actual cost of making iron varies from \$3 to \$6 per ton, according to the price which must be paid for ores, coal, &c., those mills owning both coal and ores near by having an important advantage in this respect over those which have to purchase them and, as is necessary in many cases, to move them long distances by land or water. Journals copying these tables are respectfully requested to copy this explanation also, since if given as showing the average cost of making pig and bar iron under all conditions, favorable and unfavorable, the figures would leave a larger margin of profit upon the average selling prices of iron than most furnaces and mills were able to make in 1872 and 1873.

A comparison of the different items entering into the cost of pig and bar iron in different years will be found of much interest. Taking the price of labor, for example, we find that, as an item in the cost of pig iron, it was larger in January, 1873, than at any previous time. Comparing the cost of ores, we find it larger in 1865 than at any time previous to 1872, while at the beginning of 1873 it reached the enormous price of \$15 76 to the ton of pig iron. Comparing the total cost of making a ton of pig iron, we find it advancing from \$14 25 in 1850 to \$18 87 in 1855, again, with some fluctuations to \$20 97 in 1864, \$32 21 in 1865 and \$34 19 in January, 1873, the highest cost reached in twenty-three years. In the manufacture of bar iron we find labor most costly in 1865, in which year merchant bar at mill cost \$127 11, the highest recorded. These comparisons are interesting and instructive, and if we had time and space to show the reasons for the fluctuations, the tables would be found to afford most valuable data for a history of iron manufacture in this country for nearly a quarter of a century.

Scotch Pig Iron and the Stove Trade.

The use of Scotch pig iron in the manufacture of stoves was, until recently, almost universal among our Eastern makers. The admixture of a certain proportion of it with American iron was considered necessary in order to impart fluidity to the metal employed in thin castings, and the quantity used was in about the proportion of one part in three. At present, such of the manufacturers as use Scotch pig at all have considerably reduced this proportion, and now about ten per cent. is all that is deemed requisite. It is universally admitted, even by those who still consider its use desirable, if not necessary, that it injuriously affects the quality of the casting, and that the only advantage gained by its employment is in the simple element of fluidity, by which the metal runs more easily and freely into the mold, and thus producing a sharp, clear, well defined outline of the figure intended. The question, therefore, for the manufacturer is, whether this smoothness of surface and perfection of outline cannot be produced by some other means than at the expense of the strength of the casting? In view of the development of our own mineral resources this is a subject that deserves more than a mere passing consideration. The production of pig iron in Scotland has greatly fallen off during the past year. Up to the end of November, 1873, the deficiency in exports, as compared with the same period in the preceding year, amounted to 216,550 tons, and the stocks on hand are reported small. The cause for this deficiency of supply lies deeper than the question of high wages or the relation between the cost of production and the price obtained in the market. It is a well known fact that some of the largest fields of the black band ironstone are nearly exhausted, and we have no information that other sources of supply have been discovered to take their place. It is, therefore, evident that with an increasing

scarcity of production, prices must tend upward, and it will become necessary for the American manufacturer, as a matter of something more than mere economy, to find in other metals the quality for which Scotch pig iron is especially useful. In the matters of strength and fineness of grain the superiority of American castings is universally acknowledged, and there can be no question but that, by a judicious mixture of various brands of iron in the foundry, of ores in the furnace, all the essential requisites for producing the best qualities of castings, for whatever purpose, can be obtained without requiring the addition of a particle of foreign iron. We say there can be no question of this, as it is within our knowledge that some of the largest manufacturers in this State, and among them those whose goods have a reputation second to none in the market, have not used a pound of Scotch pig iron for a considerable time, nor do they ever expect to use it again. Concerning what combinations of metal or of ores they do employ they are naturally reticent, but that only American iron is used is admitted. Of course they find it to be to their interest thus to draw their material from the resources of home production, and some of the reasons why it should be so are readily apparent. They can make their arrangements to secure a regular supply from season to season at fixed prices, and are thus relieved from the embarrassments and anxiety often caused by the violent fluctuations in the prices of foreign irons. They can, therefore, conduct their business with much better chances for success than if they were dependent on a foreign market for any part of their material. They are also enabled to regulate their affairs and to adjust the details of their business without having to take into account the variations in gold or the rates of foreign exchange. With these facts in view, it is safe to predict that the day is not far distant when Scotch pig iron will cease to be employed in American foundries.

British Iron Exports to America.

The Chief of the Bureau of Statistics furnishes the following comparative statement, showing some of the principal articles of British iron manufacture exported from the United Kingdom to the United States during the eleven months ended Nov. 30, for the years 1872 and 1873:

Articles.	1872.	1873.
Pig, tons	188,846	99,028
Bar, angle, bolt and rod, tons	63,357	29,689
Railroad of all sorts, tons	441,074	177,965
Hoops, sheet, boiler, and armor plates	29,229	17,986

This cannot be considered a very satisfactory showing when regarded from a British standpoint, nor indeed from an American. The falling off in our receipts of foreign iron is gratifying, but had we received still less we should have done better. It will be some time before any iron will be imported from abroad because we need it to supplement the deficiency of home production.

M. Caron has made a communication to the Paris Academy on the subject of tempering steel, in which he says: A piece of steel is generally hardened and then tempered down to the requisite condition. This is an unnecessary trial of the metal, and, moreover, the plunging of red hot steel into cold water causes cracks or shakes to occur—to appear would, perhaps, be the better word, as they probably already existed, but were not apparent—and he declares that after many experiments he found that if the hot steel be plunged into boiling instead of cold water an excellent temper is obtained by a single operation. M. Caron informed the Academy also that the same treatment was applicable to "burnt," that is to say, to crystalline and brittle iron, resulting from imperfect forging. It is only necessary to heat the burnt bar to bright redness, plunge it in a boiling solution of sea salt, and leave it there till the iron and solution are of the same temperature. A curious phenomenon takes place during this operation: the iron, when plunged into the salt solution, is immediately covered with a coating of white salt, which isolates it from the liquid and greatly retards its cooling. He particularly recommends this treatment for finished forgings. If they have been thoroughly wrought the tempering can do them no harm, while if, on the contrary, they have been submitted to too much or too prolonged heat, the process, as already stated, corrects the faults.

At a meeting of German engineers lately held at Lenné, Herr Hofmann called attention to his new method of desulphurizing coke, by the addition, at the moment when the fire in the coke itself is being extinguished, of chloride of manganese; and this, he added, results a formation of sulphuretted hydrogen, the manganese, together with a portion of its chloride, remaining in the coke. This method of desulphurizing may be readily carried out at coke ovens by placing the solution of chloric acid of manganese in a small lead reservoir, from whence it is allowed to run as required into the water boshes. At the same time as this announcement was made, the working of the principle of which is likely to be undertaken on an extensive scale, a statement was put forward to the effect that at a large puddling forge on the Rhine, probably with the same object in view, a wash of chloride of manganese, saturated with epsomite and chloride of calcium, had been used. This combination is already sold as an article of commerce, and contains 40 per cent. of chloride of calcium.

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Dec. 20, 1873.

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[illegible]

NEW YORK, July 1, 1878.

Map of the Mineral Resources of Chattanooga, Tennessee, and Vicinity.

Compiled from surveys made with a special view of showing the location and boundaries of the three different kinds of Iron Ores and Coal Measures lying within a radius of about one hundred and twenty-five miles of Chattanooga. It also shows the different Railroads and Navigable Rivers and principal towns within this district, and routes to Washington, New York, Louisville, St. Louis, (incl. N. Y.), Memphis, New Orleans, Mobile, and principal ports on the Atlantic Coast. This map is not published in the interests of any individuals nor landed proprietors, but with the view of enabling parties who may be interested in the manufacture of iron or steel of country containing three different kinds of Iron Ores (which are shown in different colors), as well as coal in the greatest abundance, and their relative positions to each other. The map is gotten up by the publisher after an intimate knowledge of the country for twelve years, the last year of which he has employed two competent engineers in making special surveys, with a view of making it as nearly accurate as possible. It is about 27 inches by 36 inches in size, up to a scale of miles to one inch, and printed on firm linen paper and put up in cases. It will be sold by subscription only, at the price of five dollars, and will be ready for delivery about the 25th of January next. Subscriptions can be made to the *NEW YORK* and *LOWE* publishing houses, or to H. B. NEWHALL, No. 11 Warren St., New York.

Any person wishing to engage in the foundry business, may learn an opportunity to purchase new building just erected for said business, all complete and ready to be started without delay or additional expense. A shovel factory adjoining the foundry will furnish a large and regular demand for castings. For further particulars, address,
H. F. A., Box 488, Northampton, Mass.
Or said property would be exchanged for unencumbered productive real estate.

The cutlery business having been removed to Turners Falls, the Works near Greenfield depot with all appurtenances, and about 100 horse power **will be sold low and on very favorable terms.** The Works, which are on both sides of Green River, consist of Stone, Brick and Wood Factory Buildings, and were used for many years in the manufacture of cutlery; but they are well adapted to any manufacturing business. The property is so situated that it can be divided, if desired, into two almost equal portions.

In view of the nearness of the property to the new Hoosac Tunnel Railroad Line and the beautiful town of Greenfield, it must greatly increase in value. Here is a rare chance. Who will secure it?

Address or call on **D. C. G. FIELD,**
Treasurer John Russell Cutlery Co.,
Turners Falls, Mass.

S CHURCHIL
nts & Importers of
Street, Finsbury, L
CHURCHIL & CO., 45
services for the introduction, in Great Britain and the Colonies, of
themselves in London, and during that time we have succeeded
at Britain and the Continent. We are now the European
London or New York house.
Tools to communicate with us, sending us catalogues
introduced American Vices, Chucks, Drills, Drilling Ma
meet with success.
in reference may be made.
Main Address to communicate with our New York house
purchasers of Machinery and Tools in Great Britain and
and Machinery are kept in our London Warehouse for imm
on application

SECOND-HAND MACHINERY

For Sale.

We have now on hand and will sell at very moderate rates, the following lot of second-hand machinery, viz.:

Five Double Hoisting Engines, suitable for mining, tunnelling or sluicing. Each of these engines has two cylinders, $7\frac{1}{2}$ in. diam. by 18 in. stroke; two drums 4 ft. diam. by 1 ft. long; geared to engine in proportion of 5 to 1, and are provided with disconnecting gear and friction brakes.

One 8 Horse-Power Portable Lane & Bodley Engine Cylinder, 12 in. diam. by 12 in. near new.

One 25 Horse-Power Portable Engine, in first rate condition. Cylinder, 10 in. diam. by 24 in. stroke.

One 30 Horse-Power Portable Engine, with Circular Saw, in first rate condition.

One 12 Horse-Power Stationary Engine. Cylinder, 8 in. by 12 in.

One 14 Horse-Power Stationary Engine. Cylinder, 10 in. by 10 in.

One 30 Horse-Power Locomotive Boiler, in first-rate condition, nearly new.

One 25 Horse-Power Locomotive Boiler, in first-rate condition, nearly new.

One 30 Horse-Power Vertical Boiler.

One 20 Horse-Power Vertical Boiler.

Two Flue Boilers, 28 ft. long. 42 in. diam. each two 14 in. flues, in good order.

Four No. 6 Sturtevant Blowers.

Two No. 2 Sturtevant blower.

Two No. 2 McKenzie Blowers.

One No. 5 Andrus' Centrifugal Pump.

One No. 8 Turbinate Centrifugal Pump.

Seven No. 0 Cameron Pumps.

One Knap's Pump.

One Earle Pump.

Three Woodward Pumps.

For further particulars, address,

WM. E. TA'NER & CO., Richmond, Va.

For Sale,
With or Without the Real Estate,
**The Orange County Foundry and
Machine Shop,
MIDDLETOWN, N. Y.,**
Established 1842.

The most desirable property on the line of the Erie and Midland Railways. Has a large and valuable assortment of Patterns. Extensive and increasing trade, and affords parties wishing to enter the Iron Business an unusual opportunity. Satisfactory reasons given for selling.

Parties desiring to purchase are requested to call and examine, or address the undersigned,

E. P. WHEELER, Middletown, N. Y.

**Valuable Iron Works
For Sale.**
The undersigned offers for sale the Iron Works and

Pottsville, Schuylkill County, Pa., known as "The Washington Works," consisting of a

Large Stone Machine Shop & Foundry
Brick P-ti-ern House, Erecting Shop, Stone Blacksmith Shop, Brick Office, and Lot of Ground containing in front 195 feet 3 inches, and in depth 260 feet.

There will be sold with the above a large and valuable collection of Patterns, Heavy Crane Flasks and Heavy Core Spindles for making heavy Castings and Pipes of all sizes; Turning and Planing Tools.

The Works can be put in immediate operation. A favorable opportunity is here presented for enterprising men. The demand for Castings and Machinery is constantly increasing in this region. The property will be sold on liberal terms. *If not sold it is a reasonable time it will be for Rent.*

For particulars apply to

J. W. ROSEBERRY, Trustee.
Pottsville, Pa.

FOR SALE.
Hardware, Stoves & Tinware &
Business House,
Doing a Cash Business of \$20,000 per an-
num at 25 per cent. profit, in Central
Ills. For information address "W."*
435 So. Third St., St. Louis, Mo.

For Sale or To Let.

The Stove Foundry lately occupied by Munsell & Thompson, situated at Elizabethport, N. J., can be adapted to any manufacturing purpose, having coal and iron within one block, direct from the mine. Communication with New York 32 times a day by rail, and times by steamboat. Within half a block of the river. Will be let for one or more terms, as may be applied to at address

A. RAIZ & CO.,
32 Broadway, N. Y.

LL & CO.,
Machinery & Tools
London, Eng.
93 Greenwich St., N. Y.
Continent of MACHINERY and TOOLS of improved construction and in establishing a demand which is now rapidly increasing.
Agents for several leading American Tool Makers.
and price lists. We shall be pleased to take up and introduce all kinds of Machinery, Pumps, and a variety of other tools and household articles.
and execute the orders through us, thus avoiding all risk of loss in transit, and Europe who may require special goods, for which quick and immediate delivery.

Trade Report.

Office of THE IRON AGE.
TUESDAY EVENING, Dec. 30, 1873.

The past week has been, as is usually the case between Christmas and New Years, dull and comparatively devoid of interest in Wall Street. The condition of the National finances is still a subject of interested discussion, although it is believed that the policy of retrenchment adopted by the Ways and Means Committee will relieve in a very great measure, if not wholly, Mr. Secretary Richardson's immediate embarrassments. Indeed, that most extraordinary Minister of Finance seems to have reached the conclusion that he was needlessly alarmed at first, and that by drawing upon what remains of his \$44,000,000 reserves he can, with proper economy on the part of the various departments which are now reluctantly nursing their estimates, and a temporary discontinuance of the usual provisions for the sinking fund, keep the Treasury going until the 1st of May. Had Mr. Richardson given the subject as much consideration before making his startling demand for \$43,000,000 additional taxation, as he seems to have done since his demand was refused, he would have been spared the mortification of making a conspicuous display of his official incapacity.

For the information of importers we would take this opportunity of stating that the new method of quoting sterling exchange, which goes into effect on the 1st of January, is in pursuance of an act of Congress of March 3, 1873 which provides that "all contracts made after January 1st, 1874, based on an assumed par of exchange with Great Britain of 4 dollars 44 cents and four-ninths to the sovereign or pound sterling, shall be null and void." On the passage of this act the leading drawers of sterling here agreed to quote the pound sterling at its actual price in American dollars; thus, instead of saying to-day that sterling is 108½ and 109½, it would be quoted at 4-84 and 4-88, gold, respectively. The new par of sterling exchange is expressed by the figures \$4-8665 for the pound sterling, which is practically the Mint par.

The Wall street markets continue quiet, but close strong. Money continues easy, and is quotable on call at 7½, gold, with exceptional instances in which a commission has been paid. Prime mercantile paper is in better demand at 7½ to 10 per cent.

The gold market is without important feature. The following shows the daily range of the premium:

	Highest.	Lowest.
Thursday	110½	109½
Friday	110½	110
Saturday	110½	110
Sunday	110½	110
Tuesday	110½	111

The stock market remains very dull, with principal dealings in New York Central, Western Union, Lake Shore, Union Pacific, Pacific Mail and St. Paul. We give below the highest and lowest of to-day's quotations on 'Change.

Government bonds continue firm, closing at prices given below.

The following are the movements in foreign trade for the week, so far as obtained at the hour of this writing:

	Imports.	Exports.
1871.	\$4,912,151	\$4,575,739
1872.	\$6,674,332	\$4,154,832
1873.	\$3,919,582	\$7,987,267

Since Jan. 1—\$372,586,483 \$418,780,591 \$377,907,109

Included in the imports of general merchandise for the week are:

	Quant.	Value.
Brass goods	9	\$380
Bronzes	10	907
Casins and anchors	67	8,863
Copper	47	15,499
Cutlery	222	20,821
Guns	45	6,362
Hardware	119	8,179
Iron plate, tons	14	1,330
Iron sheet, tons	7,317	147,247
Iron, other, tons	672	2,153
Lead, pigs	71	6,286
Metal goods	439	28,418
Nails	18	7,168
Old metal	11	2,085
Per. caps.	1,611	14,718
Saddlery	220,000	10,888
Spelter	3	224
Silverware	7,482	61,413
U. S. 10 reg.	335,028	61,413
U. S. 10 40 reg.	849	7,721
U. S. 10 40 40 reg.	352,314	25,512

Total for the week \$448,041
Previously reported 47,741,043

Total since January 1, 1873 \$48,189,084

The following is a comparison of the bank averages for the past two weeks:

	Dec. 20.	Dec. 27.	Differences.
Loans	\$37,191,000	\$38,094,500	Inc. \$9,000
Specie	21,975,000	21,514,300	Dec. 460,700
Deposits	194,116,500	195,102,100	Inc. 985,600
Circulation	27,135,400	27,106,100	Dec. 29,300

Government bonds closed strong as follows:

	Bid.	Asked.
U. S. 1881, reg.	116½	116½
U. S. 1881, con.	116½	116½
U. S. 5-20 1882, reg.	113½	113½
U. S. 5-20 1882, con.	113½	113½
U. S. 5-20 1885, con.	114½	114½
U. S. 5-20 1885, con., Jan. and July.	115½	115½
U. S. 5-20 1887, con.	119	119
U. S. 5-20 1888, con.	119	119
U. S. 10-40 reg.	110½	111
U. S. 10-40 con.	112½	113
U. S. Currency Pacific	114½	114½
New 5s, 1881	111	111½

The following were the highest and lowest prices of stocks to-day:

	Highest.	Lowest.
N. Y. Cen. & Hudson Consolidated	99½	98½
Lake Shore	76½	76
Rock Island	100	99½
Del., Lack. and West.	104	103½
Western Union	49½	48½
Harlem	120	119½
Western Union Telegraph	73½	72½
Northwestern	87½	87
Milwaukee & St. Paul	69½	69
Pacific Mail	109	108½
Ohio & Mississippi	38½	37½
Boston, Hartford & Erie	30½	30
Union Pacific	30½	30
C. C. & Ind. Central	27½	27
Hannibal and St. Joseph	27½	27
Consolidation Coal	50	49½

GENERAL HARDWARE.

As New Year's day occurs on Thursday, our usual day of publication, we are compelled this week to go to press on Tuesday instead of Wednesday.

As New Year's approaches, the changes expected at this season are being made. We report a great many below, and there are indications that there will be many more. In former years many manufacturers have held back to see what others would do before publishing their prices, and the same will be the case this year. The conditions under which industry of every kind is now placed are so new that little light can be gained by the study of the past. As bearing on this question, we print the following extract from a letter written by the senior member of a large English hardware firm, to his partner in this country:

In consequence of the increase of gold in the world and also, quite possibly, in consequence of the increase of paper money and other paper documents in the world, it is likely the prices of the world are made to range higher with considerable permanence.

1. There is no doubt that prices are not arbitrary, but depend on natural laws as much as water finding its level. Every article has a natural true price, and the tendency is for the price not to be exactly at the true point, but to be working towards it. Price depends upon the proportion between commodities and other things of value in the world and money in the world (for the purpose of understanding this matter all the world must be taken together). If any given moment all the money in the world were doubled, prices ought to be doubled; if halved, then prices ought to be halved.

2. Money has increased in quantity lately, and also commodities and land brought into value have increased. Which has increased most?

3. When gold in California, Australia, &c., &c., was brought so plentifully into the world, every man who understood these questions expected prices to rise, but the rise hung fire. It was not seen for a long time, but at last it is producing a part of the effect we see. But paper money, especially government paper money, probably will have much the same sort of effect, though perhaps in a less degree, partly because it is not international, but limited in its territory. There is at this moment a very large amount of greenbacks out in the United States, much in excess of the old bank notes, which excess is new in the world. There is an increased issue of many millions of notes of Bank of France paper money in Russia, Austria, Italy—I think Spain and Portugal, Brazil, &c.—all this irredeemable paper money. Beside, there are notes of the Bank of England in Great Britain and of the Bank of Prussia in North Germany, redeemable (the only two great countries without an irredeemable paper currency.)

4. Beside all this, the promissory notes, bills of exchange, checks, more or less in circulation in the civilized world, and the arrangements, like those of the clearing houses, to economize the use of money, probably, to some extent, though very much less than gold coin, have the effect of increasing the currency of the world.

5. I think it becomes very nearly certain that money has, on the whole, increased a good deal faster than the commodities. If so, the average range of prices must be higher. 6. But will this remain? According to my view, much will depend on whether the paper currencies of the world are kept up as large. I think they will be. I think and hope, for instance, that the United States will not withdraw their greenbacks, but make an arrangement to redeem them on presentation, when few would even be presented.

7. This only means the average range or mean line of prices will continue higher; the oscillations will be as great as formerly. The oscillations, for instance, of the Coal Chain ranged for fifteen years from 11s. to 17s. The oscillation may now turn out to be established for some time between, for instance, at a rough guess, 16s. to 25s.

8. We have formerly had experience of great changes in average prices. When after the discovery of America, gold and silver were brought in large quantities into the civilized world, prices gradually rose to double or treble, and never went down again.

From a letter from one of the oldest manufacturers of Edge Tools in the United States, we extract the following:

"We use Norway Iron and English Steel, and cannot make goods cheaper. We pay our skilled workmen as much now as we did last year. Norway Iron is engaged ahead at high prices for years, and English Steel is made from it. Trade is so fearfully dull that I do anything or get orders we would take 5 per cent. less than rates that we think we should have. All that sell goods cheaper than they are now will be obliged to fail."

Although there is a marked improvement in the inquiry for foreign hardware, and we have heard of some large orders for importation being placed, still we cannot report any general improvement in this branch of the trade. A cable dispatch of this date to Hermann Boker & Co. quotes 6½-10-2 Traces at 1½ in Birmingham, which is an advance of a half penny on previous figures. As we have before mentioned, the general tone of the English market for heavy goods is firm, with a decidedly upward tendency. Prices here are without change, and stocks of heavy goods in store and to arrive are by no means large for this season. Trade in Tinners' Stock and House Furnishing Hardware is light, and a revival in this department is not anticipated before the close of the holidays. The manufacturers of Brass Kettles held a meeting in this city to-day and confirmed the prices now ruling. We quote Brass Kettles, in lots of 500 lbs. and over, 50 cents per lb., net; smaller quantities, 55 cents per lb., net.

There is no change to note in the price of Nails. The card rate, viz., \$4-50, may be termed obsolete, as \$4-25, is the general asking price for 10d. in small or large lots. For orders of 200 kegs and upward a concession from this figure could be obtained. The demand, as is usual in this trade at the close of the month, is light.

The Eastern makers of Strap and T Hinges held a meeting here to-day (Tuesday) and fixed the price at discount 30 and 7½ per cent.

The Tack manufacturers held their monthly meeting to-morrow. If they should reduce prices it would occasion no surprise.

The American Screw Company, the National Screw Company and Charles Parker will use the following reduced price list for Iron Wood Screws after the 1st of January:

IRON SCREWS.

No.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100																																																																																																				
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Discount Per Cent.	
Fixtures, Chain Pump.....	15
Forks, Weeding.....	15
Flue Stoppers.....	25
Fry Pans.....	30
Hand Axes, Store Door (See Appendix B).....	30
Handles, Door or Thumb Latches.....	10
Handles, Chisel and File.....	10
Handles, Soldering Copper.....	10
Handles, Boiler.....	35
Hatches, Tea Pot (See Appendix B, page 31).....	30
Handles, Sauce Pan.....	10
Handles, Toilet Ware.....	30
Hatchets, Cast Iron.....	10
Hammers, Machinists.....	10
Hammers, Nail.....	10
Hammers, Shoe.....	10
Hammers, Steak.....	30
Hammers, Tack, Nos. 10, 15 and 25.....	15
Hammers, Tack, Nos. 31 and 35.....	5
Hinges, Cast Strap.....	10
Hinges, N. E. and N. Y. State Gate.....	10
Hinges, Raising and Plain Gate.....	10
Hinges, Reversible Plain Gate.....	10
Hinges, Blind, Fringed.....	10
Hooks, Hat and Coat (See Appendix B).....	30
Hooks, Harness.....	25
Hooks, Wardrobe.....	30
Hooks, Check.....	10
Ice Picks.....	30
Ice Axes.....	30
Jack Screws.....	10
Latches, Thumb.....	25
Latches, Roggin's Drop, only No. 10.....	5
Latches, Spiral Spring.....	5
Match Safes.....	30
Meat Cutters.....	10
Nail Sets.....	20
Nail Cracks.....	20
Pliers, Flat and Randle's Patent.....	30
Pincers, Blacksmith's Shoeing.....	35
Pokers, Stove.....	30
Punches, Saddlers (See Appendix B).....	30
Pliers, Frame.....	10
Pliers, Axle.....	10
Pulleys, Clothes Line.....	10
Pulls, Drawer (See Appendix B).....	25
Rivets, Iron.....	25
Rings, Harness and Breeding.....	15
Saw Blades.....	15
Scrapers, Foot.....	10
Scrapers, Box.....	15
Scrapers, Plumber's.....	25
Sad Stands.....	20
Saw Sets (See Appendix B).....	10
Saw Rods (See Appendix B).....	10
Shovels, Coal.....	30
Squares, Steel and Iron, less than full cases.....	10
Squares, Steel and Iron, full cases.....	10
Steeleyards, English Pattern.....	5
Steeleyards, American.....	25
Shavers, Fruiting.....	30
Spoons, Fluted Tea and Table.....	10
Swivels.....	10
Snuffers.....	10
Timers' Tools.....	10
Tack Claws.....	15
Tack Hammers, Nos. 10, 15, 25.....	15
Tack Hammers, Nos. 30, 35.....	15
Traps, Steel.....	35
Terrets.....	10
Trees, Adjusting Pad.....	10
Tobacco Cutters.....	15
Trowels, Garden.....	15
Tongue, Coal.....	25
Wagon Jacks.....	15
Waffle Iron.....	25
Wrenches, Cog, Ratchet, Wrought.....	30
Wrenches, Cog's Pattern, Malleable.....	30
Wrenches, Railroad.....	65
Wrenches, Taff's.....	20
Well Wheels.....	5
Wire Gauges (See Appendix B).....	30
Whip Sockets.....	30

APPENDIX B.	
All Goods from page 5 to 30, subject to uniform Discount.....	25
Bolts, Carriage.....	75
Casters, Bed and Plate.....	30
Cover Lifter.....	30
Fire Pot.....	20
Fire Stand.....	25
Parriers' Hammer.....	30
Handle, Tea Pot.....	30
Hand Stand.....	20
Mills, Coffee.....	15
Punches, Saddlers.....	25
Saw Rods, Clipper.....	10
Saw Sets, Aiken's.....	10
Screw Drivers.....	25
Vise.....	20
Wire Gauge, Smith's.....	25

The Atlas Nut Company report the following reduced prices:

Machine Bolts.....	30
Coach or Lag Screws.....	30
Shaft Couplings.....	30

Buck Brothers, manufacturers of Chisels, etc., Millbury, Mass., write us as follows, under date of Dec. 29th:

We do not propose to make any material changes in our rates, as our goods cost us fully as much now as they did one year ago—steel being 2 cents (g. d.) per lb. more now than at that time. On our Shank goods we add 22½ to 25 per cent., or \$5.50, gold, to the 2 sterling. On Socket Firmer Chisels we add 20 per cent., which is equal to 50, 10 and 5 per cent. discount for our extras, and 50, 20 and 5 per cent. discount for our No. 1, using other makers' lists. On Socket Firmer Gouges we add 30 per cent. On Framing Chisels we make a discount of 15 to 17½ per cent. On Slicks and Corner Chisels we make a discount of 10 to 12½ per cent. Ice Chisels, 3 in. and 3½ in., \$16 and \$18 per dozen. On our Nail Sets, Screw Driver Bits, Handles, etc., we make no changes. Our works have been running as usual, with a fair business.

The following is the discount sheet of the Ohio Tool Company, of Columbus, O., bearing date January 1st, 1874. Clark, Wilson & Co. are their agents in this city.

Dis. per cent.	
All goods to No. 151 of Catalogue, inclusive.....	20
Bench Planes, No. 152 to No. 182, inclusive.....	10
All goods from No. 182 to No. 182, inclusive.....	25
Coopers' Wood Tools.....	25
Bench Screws and Buns.....	25
Hand Screws and Cabinet Champs.....	25
Turned Wooden Ware, Saw Frames and Buckles.....	10
Coopers' and Carpenters' Edge Tools and Chisels.....	10
Plane Irons.....	10
Planes without Irons.....	10
Planes with English Irons.....	10
Tress Hoops, No. 1.....	20
Tress Hoops, No. 2.....	20
Mallets.....	20
Patent Anger Handles.....	20
Raise-Boxwood, Ivory and miscell. boxes.....	20
Premium Gauges, and Sholl's Patent Combination.....	40
Plumbs and Levels, and Pocket Levels.....	50
Try Squares and T Bevels.....	25
Screw Drivers, Wilkinson's Pattern.....	10
Sewing Machine Screw Drivers, 1½ in. Applewood handle, \$5 per gross.....	10
We make no Planes of Saylor's brand, except Bench Planes. No charge for boxes for Bench and Hand Screws, when ordered in full cases. All other boxes charged. Bench Screws packed in cases of one dozen. Hand Screws, to 12 in. inclusive, packed in cases of two dozen. Larger sizes packed in cases of four dozen. To parties whose purchases of goods of our own manufacture—Tress Hoops excepted—amount to \$500 net, prior to January 1st, 1873, a credit of 7½ per cent. on such goods will be given, when that amount is reached. Price subject to change without notice. All invoices will be made at rates ruling at date of shipment. Terms: 30 days from date of shipment; payable here in bankable funds, or New York Exchange.	

Dis. per cent.	
Sandusky Tool Company, 1st quality Planes.....	30
Ogonuts.....	20
Coopers' Wood Tools.....	25
Auger, Chisel and Saw Handles.....	25
Bench Screws.....	25
Bung Starts.....	30
Mallets.....	20
Hand Screws and Cabinet Clamps.....	25
Rolling Pins, Potato Mashers and Beef Mauls.....	10

Discount Per Cent.	
Plane Irons.....	10
Planes without Irons.....	10

No charge will be made for Hand and Bench Screw Cases.

The Greenfield Tool Co. quote their 1st quality Planes at dis. 30 per cent., and 2d quality at dis. 40 per cent. The Owasco Tool Co. also offer their Planes at the same figures. It is reasonable to suppose that other manufacturers will meet these figures.

The Stanley Rule and Level Company have in press a new illustrated catalogue and price list, which will be sent to the Hardware trade in a few days. Several of the leading lines of tools manufactured by them have been increased; and the new list embraces many specialties, properly classified and illustrated. A revision of prices and of discounts has been made in many lines of goods, with reference to equalizing prices, and introducing more uniform rates of discount from the entire list. Their discount sheet, dated January 1, will accompany the price list.

Clark, Wilson & Co., 81 Beekman street, give notice of the following changes in their firm:

The firm of Clark, Wilson & Co. dissolves on the 31st inst. Messrs. Hull Clark and John E. Byrne retiring.

The undersigned succeed Clark Wilson & Co. under the firm name of J. Clark Wilson & Co., at 81 Beekman street, commencing January 1st, 1874.

J. CLARK WILSON,
HENRY L. BUTLER, JR.,
WM. KUMBLE WILSON,
ALBERT FERGUSON.

We would call the attention of the trade to the advertisement of the new firm of John F. Hazen & Co., of Cincinnati, Ohio, which will be found among special notices on the 17th page.

Both of the gentlemen consulting the firm, Mr. John F. Hazen and Mr. Guzzam Gano, are long and favorably known to the Hardware and Metal trades of the country, and need no endorsement at our hands.

Fisher & Norris, Trenton, N. J., will make no change in list or discount for their goods for the ensuing season; the reduced prices of November 1 will be maintained.

Joseph Dixon Crucible Co., Jersey City, N. J., have recently completed a handsome addition to their already large Black Lead and Crucible Works. The new building is a three story structure, with deep cellar, 100x40 feet, and as soon as the weather will permit another building will be added, 175 feet long and 30 feet wide. This establishment is now the largest of its kind in the world. They will make no change at present in the prices of their goods, but contemplate, before long, to make a small advance on some items. We are pleased to notice the generous appreciation which Dixon's American Graphite Lead Pencils have met with wherever they have been introduced. They have been awarded, for 1873, the Grand Medal of Progress at Vienna, the first premium at the Cincinnati Industrial Exposition, and the first premium at the Brooklyn Industrial Exposition. We have used them for months in our office, and consider them superior to any pencil in the market.

The discount off E. M. Boynton's Lightning Cross Cut Saws on and after January 1st will be 30 per cent., as heretofore, and to all parties who pay for purchases made after that date, on receipt of invoice, an extra discount of 5 per cent. will be allowed. These goods have been awarded a silver medal at the American Institute Fair, and are finding a market in Australia, to which country heavy shipments have recently been made.

Bruce & Cook, the well known importers of Tin Plate and Metals, have got up a handsome calendar for 1874 for presentation to their friends.

J. F. Green & Bro., Haverstraw, N. Y., will make no change in the price of their Family, Ship and Framed Grindstones, which are quoted at discount 20 per cent., as heretofore. Their Patent I. X. L. Coal Sieves, Coal and Sand Screens are net list. They have patented an improvement in Family and Framed Grindstones, by which they may be packed in less space, and with greater security, than formerly.

The Nicholson File Company will issue, under date of January 1st, a circular giving their terms as follows:

Notwithstanding the forced decline in general merchandise, consequent upon the late panic, we are convinced that any considerable decline in files made at this time would in all probability be of short duration. We have therefore thought it best to abolish our circular rates of July 10th, 1873, and fix our factory discount on Nicholson Files from and after this date (which we are fully confident should be sustained for the season), at 10 per cent. from \$5 to 2 list terms, 30 days.

Accounts will be made up and statements rendered the first of each month, and such as are not settled with in 30 days from the time they become due, will be charged interest at the rate of 1 per cent. per month all time over due, and subject to sight draft without notice. All goods boxed and delivered in Providence free of charge. In all cases possible, through contracts for freight will be obtained at the lowest rates and classification.

Parties underselling our "factory discount" must be considered as opposing our interest, and will thereby forfeit such special discount as any large quantity purchased would otherwise entitle them to.

We offer our Royal Files, to the extent we have on hand from time to time, at 35 per cent. discount—not warranted. These files are made for our first quality, being rejected for various causes upon inspection.

Regarding some other matters of interest we quote from their circular:

We have made during the past season, and are still making, liberal additions in machinery and improvements, to our already large establishment, by which we hope to keep pace with the rapidly growing demand for the "Nicholson" File.

We have improved our Tapers both in shape and cut. Our Slim's (see price list below) are fast growing in favor; and our "Double-cut Tapers" compare very favorably for use with "Stubbs" beside being much cheaper.

Our Horse Raps are now made from cast steel, with improved teeth, and are giving general satisfaction.

Our large size Flat and Hand Files are much heavier than formerly, beside possessing that fullness in the center so much desired by the mechanic, but so difficult to obtain, even in the best English makes.

We would also refer to important and valuable improvements recently introduced in our tempering department, enabling us to produce Files of a uniform hardness and temper hitherto thought to be impossible.

All Nicholson Files under 7 in. are put up in boxes of one dozen each.

We again desire you to be on your guard against further attempts at deception by parties offering inferior Files fraudulently labeled "Increment," in imitation of our own, as our Files, and ours only, are cut with the Increment cut.

The "Slim" Tapers referred to above are somewhat cheaper than regular Tapers, as will be seen by the following comparative price list:

SINGLE CUT TAPERS.	
"Slim".....	4 5 6 7 8 in.
Regular.....	\$1.10 1.31 1.75 2.17 2.67 per doz.
.....	1.13 1.38 1.86 2.38 3.00

A. C. Downing & Co., Importers of French Window Glass, have issued a price book, which contains elaborate tables extending over 36 pages, giving the price per box, price per light, and the number of lights per box for any size, from 6 by 8 inches to 38 by 62 inches; also cuts showing various patterns of ground and cut, upright and head lights, and colored lithographic fac-similes of various designs of Enamelled Glass. This book is handsomely printed, and must be of great service to all who deal in Glass. It is, we believe, the first and only one of the kind ever issued.

The price of the well known tools made by D. R. Barton & Co. is discount 20 per cent., with 5 per cent. additional on \$500 worth or over. We are informed that no change is contemplated at present.

IRON.

American Pig.—On all hands the report is that things are very dull. The week between Christmas and New Year's is always so. Makers are still out of the market. They have sold all the iron they can deliver now, and decline to make contracts for next year, except for January delivery. There is hardly an Eastern Iron Company that will go out of the year with any considerable unsold stock on hand. We hear of holders asking as high as \$37.50 for No. 1 Foundry, but as there would be no difficulty in buying at our quotations, we do not change them. We quote No. 1 Foundry, \$35; No. 2 Foundry, \$31 to \$33; Gray Forge, at works, \$27 to \$28; White and Mottled, at works, \$24.

Scotch Pig.—There is no change in the tone of the market. Stocks here are small, and the demand less. The difference in price between Scotch and American is too great to allow much business. We quote, nominally, Gartsherrie, of which there is very little here, \$48; Coltness, \$45; Glengarnock, \$42 to \$43; Eglinton, \$41 to \$42.

Following are the prices of Scotch Pig Iron in Glasgow, as reported by Messrs. J. E. Swan & Bros., under date of Dec. 12:

	No. 1	No. 2	No. 4
Gartsherrie.....	113/6	107/	107/
Coltness.....	115/	108/	108/
Summerlee.....	113/6	106/	110/
Langloan.....	112/6	106/	106/
Govan.....	107/6	106/	110/
Calder.....	111/6	107/6	107/6
Shotts, Ressemer.....	115/	150/	150/
Do Ordinary.....	112/6	107/6	107/6
Carbarnock.....	109/	106/6	110/
Wishaw.....	107/6	106/	105/
Monkland.....	107/6	106/	106/
Chapelhall.....	112/6	107/6	107/6
Clyde.....	107/6	106/	107/6
Quarter-Clyde.....	107/6	106/	107/6
Glasgow Warrants 3-5, No. 1; 2-5, No. 3, g. m. b. 105/9.			

* f. o. b. Glasgow, 1/ per ton, extra.

WEST COAST BRANDS—f. o. b. Ardrossan.

	From Glasgow.	From Ardrossan.
Glengarnock.....	110/	106/6
Ardrossan.....	110/	106/6
Eglinton.....	107/	105/
Lugart.....	107/	105/
Portland.....	107/	105/
Dalmellington.....	108/	106/

CURRENT RATES OF FREIGHT ON PIG IRON.

To	From Glasgow.	From Ardrossan.
New York.....	17/6	17/6
Boston.....	17/	17/
New Orleans.....	20/	20/
Baltimore.....	17/6	17/6
Philadelphia.....	16/	16/
Providence.....	15/	15/

Bar.—There is no change in prices, which we quote from 3 to 3½ cents at mill.

Rails.—We note sale of 3500 tons American Rails on private terms. We quote \$60 to \$65, at mill. There have been no sales of English, which we quote \$55 to \$60, gold.

Old Rails.—The market is firmer than it has been, and we quote \$40 to \$43, according to views of holders. 800 tons sold on private terms.

Scrap.—Wrought Scrap, from yard, is variously held at \$40 to \$45. We note sale of 700 tons.

METALS.

Copper.—There was a fair amount of activity in Lake Copper early in the week, with the demand principally for future delivery. Later, however, the market has presented a quiet appearance, dealers being generally busily engaged in settling up their year's accounts. The position at the close is considered healthy, and holders generally pretty firm in their ideas. Sales include 250,000 lbs., prompt delivery, at 24½¢ @ 25¢, closing at the outside price, and 2,000,000 lbs. for delivery during February and March at 25¢, with 26¢ asked at the present writing. Manufactured Copper and Yellow Metal Sheathing is quoted steady at the following figures: Yellow Metal Sheathing, 25¢ @ 26¢; do. bolts, 30¢, and do. nails, 26¢. Braziers' Copper, ordinary sizes, over 16 oz. per square foot, 35¢; do. 16 oz. and over 12 oz. per square foot, 38¢; do. 12 oz. per square foot and lighter, 41¢; Sheathing Copper, over 12 oz. per square foot, 33¢; do. 12 oz. per square foot and lighter, 41¢; Bolt Copper, 35¢.

Tin.—There has been a fair movement in Pig Tin the past week, though the market at the close is quiet. Prices are held with confidence, and are generally a trifle higher than

a week ago. We quote Straits at 28½¢ @ 28½¢; English, L. & F., 26¢ @ 26½¢; English Refined, 27½¢ @ 27½¢; and Banca, 32½¢. Sales include 100 Slabs Malacca at 28½¢, 2500 Slabs Straits, chiefly for lots to arrive, at 28¢ @ 28½¢, 500 Slabs do., to arrive, on private terms. 15 tons English at 28½¢ @ 28½¢. The above prices are all gold. Tin Plates continue in fair request, and prices are still firmly held. We quote: I. C. Charcoal, \$10.25 @ \$10.50; I. C. Coke, \$8.25 @ \$9; Charcoal Terne, \$9.25 @ \$10, and Coke Terne, \$6.75 @ \$8.50.

Lead.—There has been scarcely anything doing in Pig Lead, either foreign or domestic, and prices must be considered more or less nominal. We quote about 6½¢ @ 7¢, gold, for foreign, and 6¢ @ 6½¢, gold, for domestic. Manufactured Lead is quiet, but steady, at 9½¢ for Bar, 10½¢ for Sheet and Pipe, and 10½¢ for Tin Lined Pipe, all less the usual discount to the trade.

Spelter and Zinc.—Foreign Spelter is very quiet, but with a light stock here; prices continue nominally about steady at 7½¢ @ 7½¢, gold, for Silesian. Domestic plates are in moderate request, at about 8½¢, currency. Sheet Zinc is quiet, but steady, at former prices.

Antimony.—Only small jobbing lots of Regulus are moving, at about 12½¢, gold.

COAL.

The rumors which have gained currency during the past few days of an arrangement between the coal companies supplying this market to put down the price of anthracite in the spring, seem to lack foundation in fact. Whether they will do so or not when the time comes, remains to be seen; but there is no reason to suppose that they would announce their intention at this early day, and thus give the miners two or three months warning of a change which they would make every effort to resist in the belief that such a cheapening of the product would be attended with a reduction of wages.

The operators can control the course of trade to a certain extent, but the miners are the "power behind the throne," and through the agency of the W. B. A. they can, at least in the anthracite region, control the course of the market in pretty much their own way, and by a well concerted strike they can at any time disorganize, if not defeat, the plans of the companies. Coal is generally somewhat cheaper in the spring than at any other season, owing to the competition between the companies to secure the yearly contracts of large consumers, but it would be neither possible nor expedient to fix at this time the price for next spring.

There is but little to note in the way of changes in the condition of the coal market. The holiday season is always dull, and this year it is especially so, owing to the limited consumption on manufacturing account. Some business is expected in contracts before the end of the year. The strike of the locomotive engineers on the Pennsylvania Railroad is likely to stop the shipments of bituminous coal until the difficulty is settled, and regular traffic resumed; but the demand is so small that no present necessity exists for the replenishment of stocks.

Prices remain about the same as quoted last week. As the monthly sale of Scranton coal is held to-morrow we omit quotations, although it is doubtful if the market will be materially affected thereby.

PHILADELPHIA.

PHILADELPHIA, Dec. 29, 1873.

While there is no especial excitement in the market, there is a steady improvement and a gradually increasing consumptive demand.

The furnace companies are well sold up for the year and few of them will carry any unsold stock over. The disposition on the part of makers of Pig Iron seems to be very conservative, with a desire to avoid contracting their product at such rates as now offer. The views of consumers and producers are widely different as to the price for the year. The former think that \$36 should be the opening figure, and that the demand for finished Iron will not warrant anything above this. The makers now ask \$36 for immediate deliveries, and look for \$38 in February, with \$40 as an ultimatum for the year.

Whichever is right, it is clear that many who would not buy when No. 1 Foundry was \$33 and Forge \$25 are now regretting their timidity, and securing stocks at present rates. Few transactions can be expected for the next fortnight. The mills are all idle during the holidays and rarely do anything in all January. The foundries and other works are generally dull, and consumers shrink from purchasing until the new orders give some indication of the probable volume of business. No softening in prices is, however, noticeable. \$35 is refused for January and February deliveries of No. 1 Foundry, and \$36 to \$37 asked. In Manufactured Irons there are better prospects. Bar has not materially altered, but is firmer in price. Rails are beginning to move, and there are some large cash contracts pending which will enliven the market. A very considerable purchase, a number of thousand tons, has been made by a railroad company from an Eastern mill. The transaction was private, but serves to show the current of affairs. Indeed, the very small importation of rolled iron for the year—less than 250,000 tons of all kinds—shows that no amount of competition need be feared from abroad. Old Rails are more active at advancing rates, and naturally in demand as Forge Pig grows scarce and dear. Scrap sympathizes with the advance, and is some \$2 to \$3 higher, and wanted. Lehigh Irons are scarce, and the best grades of Schuylkill sold up to date. Prices may be quoted as follows:

Pig—No. 1 Foundry, \$34 to \$36; No. 2, \$31 to \$33. Forge, \$28 to \$30.

BAR—\$34 to \$37 cts. per lb., the latter nominal, and asked only.

RAILS—Firm at \$80 to \$85, with small sales at both figures, and a large one on private terms.

SCRAP—\$38 to \$40 as to selections, for choice pilings.

OLD RAILS—\$40 to \$42, with much more inquiry.

The sales include some 2000 tons No. 1 Foundry, in 300 tons lots and under, at quotations; 500 tons No. 2 Schuylkill, \$28, at furnace; 2000 tons Gray Forge at \$29, spot; 1500 tons Old Rails, said to be \$41.50, and 1000 tons Muck Bar, on private terms. Sales of Scrap have been confined to small lots, owing to scarcity

PITTSBURGH.

PITTSBURGH, Dec. 27, 1873.—Trade, while it cannot as a general thing be termed active, is holding out well, considerably better than was expected, and

many of our large manufacturing establishments, which it was thought at the commencement of the panic would soon be compelled to suspend, are still in operation, and some of them will scarcely be able to spare the time to stop to take stock and make repairs. The outlook here has improved very materially during the past thirty days. We have had no suspensions, defaulters or forgeries recently.

Money is working easier, collections are more satisfactory, and what is more important still, confidence is being restored. The operations in Pig Iron have been comparatively light during the past week, although, taking everything into consideration, there was a very fair volume of business in the aggregate. The market continues strong, and, as might be expected, the recent advance has checked the demand somewhat. There would be no difficulty in placing several thousand tons at the rates prevailing prior to the advance in question, but it was only those who were pressed for money that sold, and they being in better shape, financially, are now holding stuff for higher prices. Choice Gray Forge Mill Iron, very firm at \$30.4 months; most of the sales this week have been at this figure, and the impression seems generally to prevail that a further appreciation is probable. Producers claim that even the advanced rates do not cover the cost of making it, and some of them are indifferent about contracting for future delivery at current prices, being apprehensive that a further appreciation is not probable. It is true, stocks in first hands are large, unusually so, but the supply in hands of consumers, as a general thing, is very much reduced; and then it should be remembered that the production has been very much curtailed. A large percentage of the furnaces in the Shenango and Mahoning Valleys have been out of blast for some time. The market for Foundry Irons is firmer, also, and prices are higher. No. 1 may be quoted at \$34 to \$35.4 mos., and No. 2 at \$30 to \$32. Mottled and White Iron, \$25 to \$26. Charcoal Irons are also firmer, but the

The Spring and Axle Company, of Bridgeport, has received from California an order for

The Spring and Axle Company, of Bridgeport, has received from California an order for 1420 pairs of springs. This is the largest single order of the kind ever received in Bridgeport.

MISSOURI.

The St. Louis Bolt and Iron Company have increased the capacity of their works and are now manufacturing a first-class flat rail for street railroads. They are filling a large order for the Washington avenue line of St. Louis.

The St. Jo Lead Mine, sixty miles from St. Louis, works 100 men—five miners, fifty surface men—makes 3000 tons of lead per month.

have taken—makes 5000 pigs of lead per month; have taken \$50,000 worth of lead ore from two acres of land, and owns 800 acres. The vein is stratified, disseminated ore under eighty feet of sap rock, and is ten feet thick. The mining plant cost \$100,000. It crushes eighty tons of ore per day, and the industry of the company is fully established for a long series of years. The mines is capable of paying \$100,000, net, annually.

The Collier White Lead and Oil Works, in St. Louis, were destroyed by fire Dec. 23. Loss \$160,000.

ILLINOIS.

The new shops of the Chicago, Burlington and Quincy Railroad, at Aurora, are well ahead. The tools and machinery are going into the blacksmith shop; the chimney (which will be 24 feet high above the water table) begins to overtop the buildings around; the slating of the roof, there completed, and the old Clinton

McCormick's Reaping Works, in Chicago, were established in 1846. The buildings cover more than twenty acres of ground. Nearly 800 reapers are finished every week, and 800 artisans

The Chicago Plow Company, with a capital of \$150,000, employs 160 men and turns out \$250,000 worth of plows and other farming implements per year.

The Hoyt & Brother Manufacturing Company, Aurora, employ 40 men in their foundry and machine shop. These parties will soon have a boring machine, on a new principle, in the market.

OHIO.

A new firm, named Wick, Ridgeway & Co., and composed of Charles D. Arms, Caleb B. Wick, M. S. Ridgeway, Henry K. Wick, Ralph A. Wick, and Peter Gillean, will hereafter run the Valley Rail Mill, at Youngstown. The name of the manufactory has been changed to Ridgeway Iron Works. The above named gentlemen are

periened in the iron business, and wall, we must, evolve success out of the embarrassments that have interferred with the running of these works since the beginning of the panic.

Certificates incorporating the Globe Iron Company, of Jackson, with \$120,000 capital; the Vinton Coal and Iron Company, of Vinton county, with \$50,000 capital; the Springfield Alleable Iron Company, of Springfield, Clarke county, with \$100,000 capital; the Findlay manufacturing Company, with \$300,000 capital, manufacture machinery and wares composed of wood and iron; the Tiffin Shoe Factory, with \$0,000 capital; the Delphos Brewery, with \$30,000 capital, have been filed with the Secretary of State at Columbus.

The Lawrence Iron Works, Ironton, stopped on the 13th ult., to remain closed indefinitely, on account of a difference between employers and employees concerning wages. The Bellefontaine Nail Works resumed on the 15th ult.

The Etta Iron Works, of Lawrence county, is well ahead, and are to be models, it is said. They will have two furnaces. one of them

ready supplied with the Fairlie self-coking apparatus, and both furnished with the Whitwell

[illegible]

Charcoal	1	qual.	1	17	0	2	19	0
"	2	qual.	1	17	0	2	19	0
"	3	qual.	1	15	0	1	17	0
"	4	qual.	1	15	0	2	18	0
Coke	1	qual.	1	15	0	1	17	0
"	2	qual.	1	15	0	1	17	0
Canada Plates	1	qual.	21	0	0	21	10	0
"	2	qual.	21	0	0	21	0	0
Pen- ton	1	qual.	12	0	0	12	8	0
Pen- ton	2	qual.	12	0	0	12	8	0
Pen- ton	3	qual.	12	0	0	12	8	0
Pen- ton	4	qual.	12	0	0	12	8	0
Pen- ton	5	qual.	12	0	0	12	8	0
Pen- ton	6	qual.	12	0	0	12	8	0
Pen- ton	7	qual.	12	0	0	12	8	0
Pen- ton	8	qual.	12	0	0	12	8	0
Pen- ton	9	qual.	12	0	0	12	8	0
Pen- ton	10	qual.	12	0	0	12	8	0
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Pen- ton	41	qual.	12	0	0	12	8	0
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Pen- ton	43	qual.	12	0	0	12	8	0
Pen- ton	44	qual.	12	0	0	12	8	0
Pen- ton	45	qual.	12	0	0	12	8	0
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mercant, type on Tees.	3	0	0	11	0	0
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to, Swedish, in London.	19	0	0	19	10	0
arrive.	30	0	0	21	0	0
to, N. No. 1.	3	0	0	11	0	0
to, f.o.b. Type or Tees.	4	10	0	5	10	0
to, No. 4, f.o.b.	3	0	0	11	0	0
to, f.o.b. 1000.	3	0	0	11	0	0
" Spikes	12	10	0	14	0	0
China Ch'col Pigs in L'lon	0	0	12	0	0	0
steel	—	—	—	—	—	—
ed, in kegs (rolled)	21	0	0	0	0	0
to, hammered.	22	0	0	0	0	0
to, in jaggies	22	0	0	0	0	0
to, in kegs	22	0	0	0	0	0
to, English, spring.	34	0	0	35	0	0
to, end - 7 ton	—	—	—	—	—	—
to, English, 6 ton	24	0	0	24	5	0
to, I.B.	4	0	0	0	0	0
to, W.B.	25	0	0	0	0	0
to, Sweden	25	0	0	25	10	0
to, Red Lead.	25	10	0	0	0	0
to, White.	30	0	0	32	0	0
to, Sweden	30	0	0	30	0	0
to, Danish.	28	5	0	28	7	8

At the works, 1s. 1s. 6d. per box less. Terms plates per box and 100 plates of similar size. * Nominal add. 6s. for each X.

100

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All Nicholson Files are cut with the Patent Increment Cut, an invention owned and controlled exclusively by us, the file cut in this manner being Patented as a new article of manufacture, and differs from all other machine cut files (all of which have their teeth cut with equal spaces) by being cut with teeth slightly expanding or increasing in size and space from the point, thus avoiding the too great regularity of teeth common to all other machine cut files. The tendency of all cutting tools with teeth or cutters placed at regular distances from each other may be illustrated (to the machinist at least) by the fluted reamer—as it is well known that if a round reamer be made with (say 12) teeth whose spaces are equidistant, the hole reamed will not be round and smooth, but will approximate to a hexagon in shape. Whereas, if the same number of teeth be made of irregular distances, the hole reamed will be both round and smooth. The same is true of a file, hence the necessity of its having teeth at unequal distances, and to which we have applied the name of Increment Cut File, which possesses all the advantages of hand cut work, and the accuracy and uniformity of machine work. It is now upwards of seven years since this File was introduced to the public, and the demand has increased until our production is undoubtedly treble that of any File manufactory in the country.

We put all files under seven inches in boxes of either one-half or one dozen each. These boxes are neatly arranged, and open on the end, on which the kind is plainly marked with printed labels, acknowledged improvements on the old methods.

The "Increment File" is not an experiment, but an established fact, and already has acquired a legitimate demand for upwards of 500 dozen per day. We employ no regular Travelers, but our goods may now be found in the hands of the principal jobbers and dealers throughout the country.

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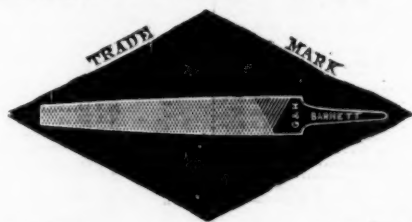
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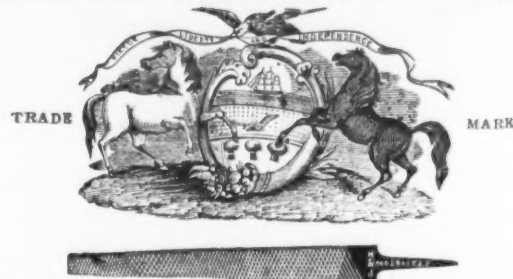
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HARDWARE

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FINE WIRE—NET PRICES.		
No.	High Brass.	Low Brass.
No. 26	0.41	0.31
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No. 99	0.41	0.31
No. 100	0.41	0.31

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Paints, Oils, etc.

Paints.	
Black, lamp—Coach Painters.	1.50
Black, lamp—Ordinary.	1.00
Black, lamp—In oil.	1.50
Black, lamp—In oil, best.	2.00
Blue, Prussian, fair to best.	1.00
Chinese, dry.	1.00
Ultramarine, fair to best.	1.00
Brown, Spanish.	1.00
Van Dyke.	1.00
Caroline, 40.	1.00
Green, Chrome.	1.00
Paris.	1.00
Mineral Paints.	1.00
Orange Mineral.	1.00
Red Lead, American.	1.00
English.	1.00
Venetian (S. C.) dry.	1.00
Indian, dry.	1.00
Rose Pink.	1.00
Siguan, American, Raw.	1.00
Burnt.	1.00
Raw.	1.00
Umber, Burnt.	1.00
Raw.	1.00
Vermilion, Chinese.	1.00
English.	1.00
Trieste.	1.00
American, Common.	1.00
White Lead, American, pure dry.	1.00
White, Paris, English, prime.	1.00
Yellow Ochre.	1.00
Vermilion.	1.00
Chrome.	1.00
Zinc White, American No. 1, dry.	1.00
French Paris.	1.00
Linseed Raw.	1.00
Boiled.	1.00
Whale, Crude.	1.00
Resin, Crude.	1.00
Sperm, Crude.	1.00
Winter unbleached.	1.00
Seal, Extra Refined.	1.00
Lard, Pure White.	1.00
Cotton Seed, Crude.	1.00
Southern Yellow.	1.00
Natural Lubricating.	1.00
Asphaltum.	1.00
Char.	1.00
Dryer, Patent, Am.	1.00
Flocks.	1.00
Frostings.	1.00
Glue, White.	1.00
Sheet.	1.00
Glass, Points, Zinc.	1.00
Gum, Copal.	1.00
Dammar.	1.00
Shellac, English.	1.00
Litharge.	1.00
Pumice Stone, selected lump.	1.00
Patty in bladders.	1.00
Putty in bulk.	1.00
Bottom Stone, soft, English.	1.00
Whiting, Spanish.	1.00

French Window—1st, 2d, 3d, and 4th qualities. Per box of 50 feet.

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French Window—1st, 2d, 3d, and 4th qualities. Per box of 50 feet.

Hardware.

THE
Peck, Stow & Wilcox Co.,

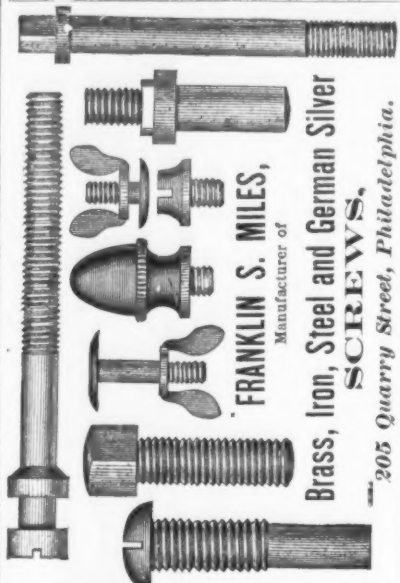
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efficient ever
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European Agents, 25 Wilson St., Fitzbury, London, E. C.

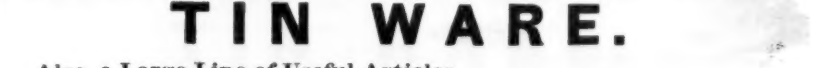
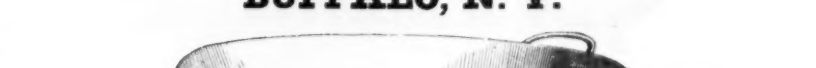
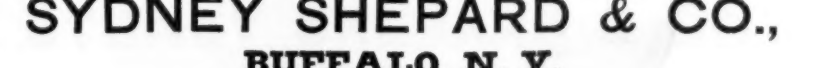
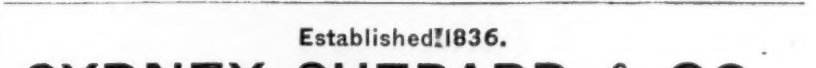
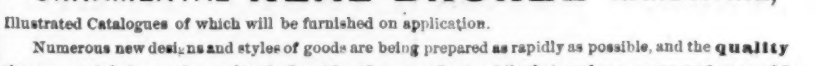
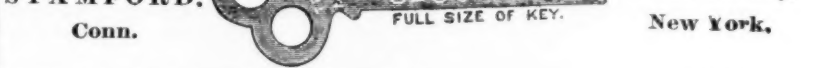
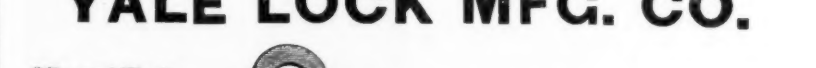
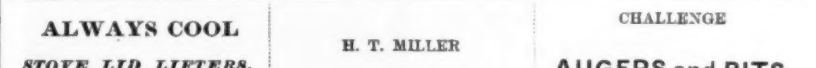
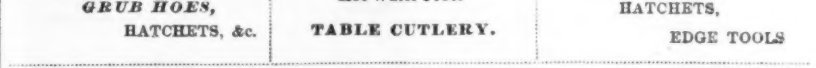
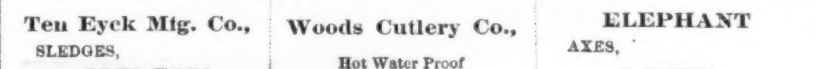
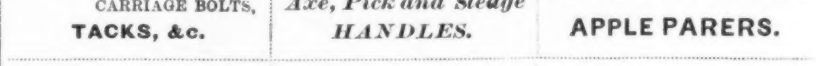
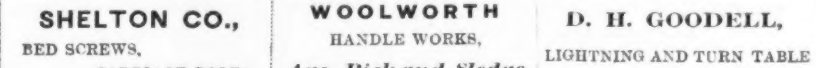
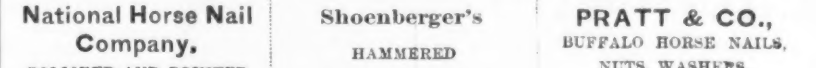
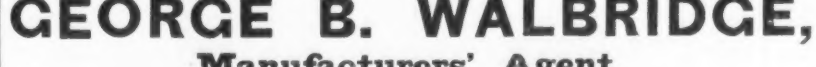
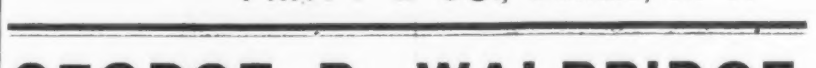
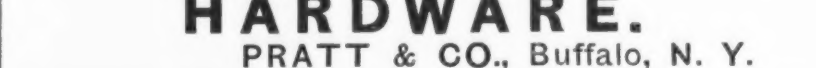
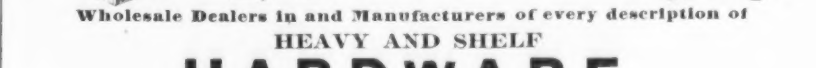
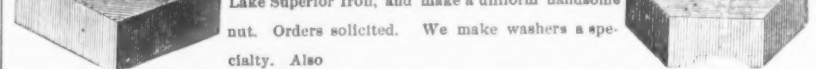
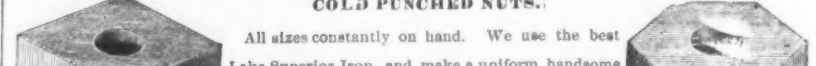
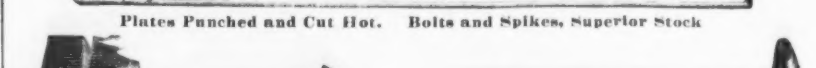
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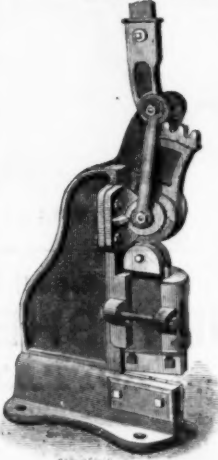
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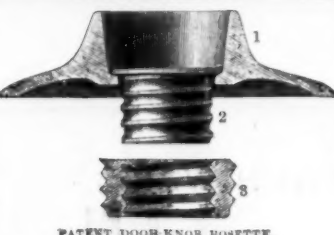


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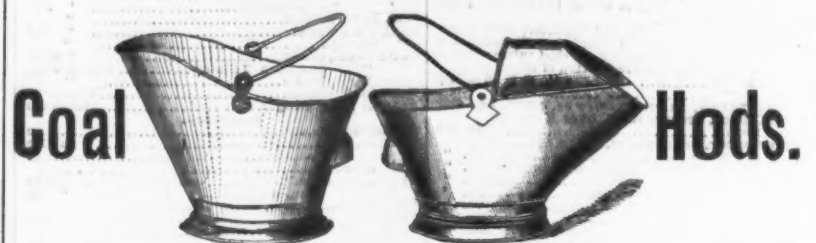
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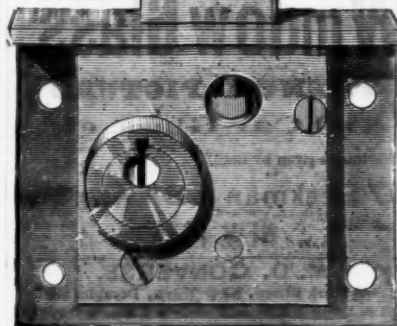
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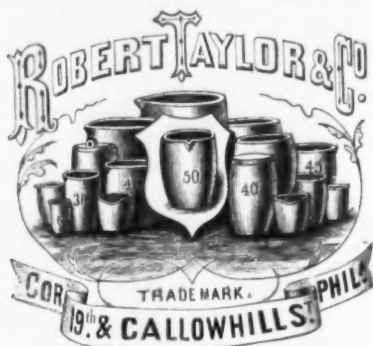
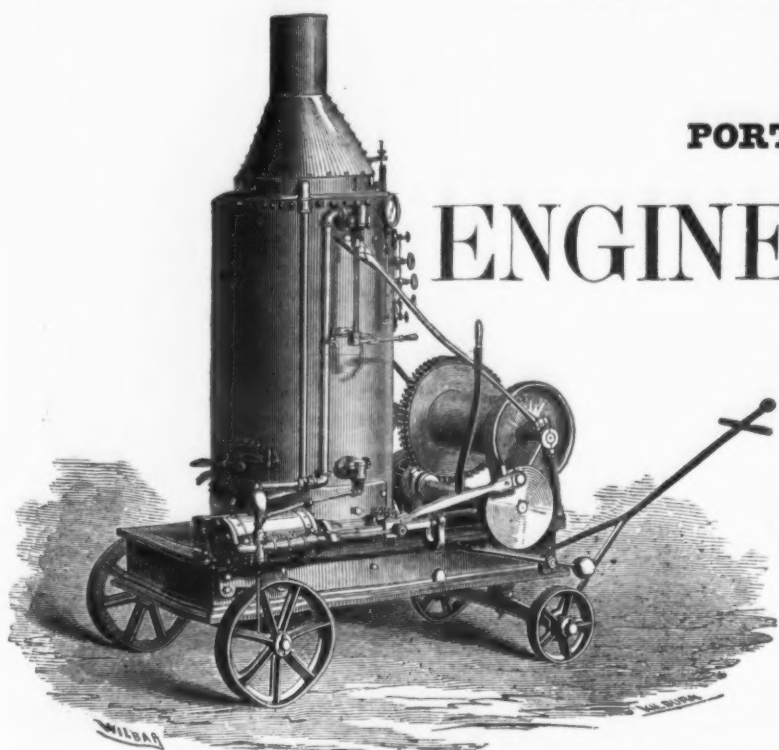
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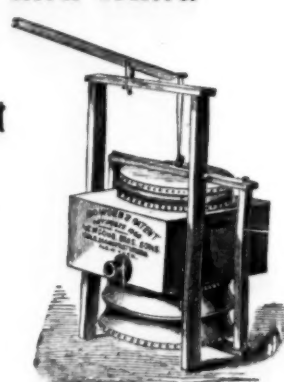
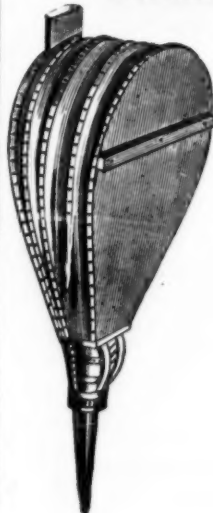
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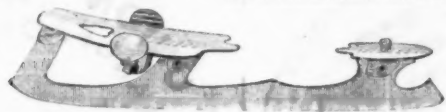
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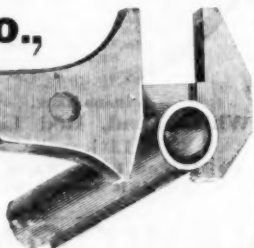


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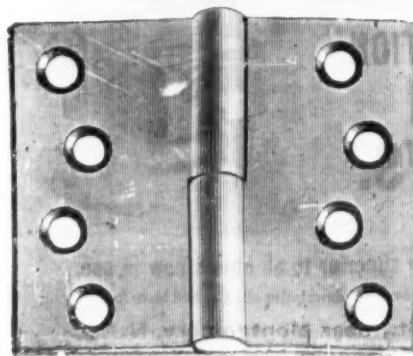
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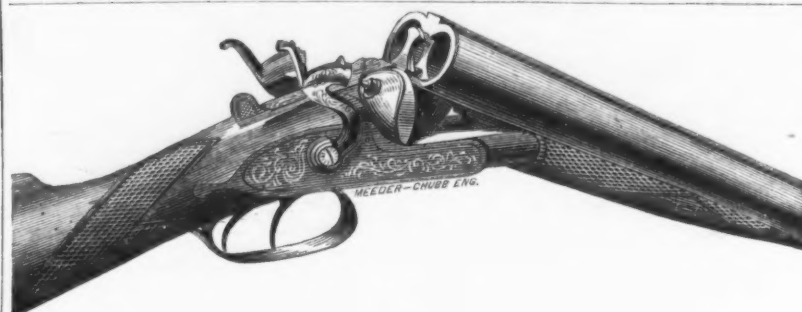
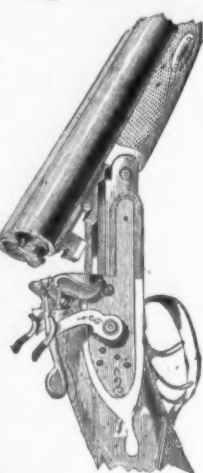
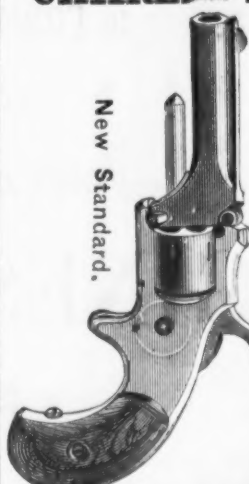
Wesson's New 7-Shot

Revolvers; Wrought Iron Frame, beautiful

model, work unsurpassed.

GUNS, PISTOLS, GUN MATERIAL, &c.

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"Scott's Breech Loaders."

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Double and Single Guns and Sportsmen's Goods.

Colt's New Cartridge Revolvers, very compact and positively perfect.

Send for Samples.

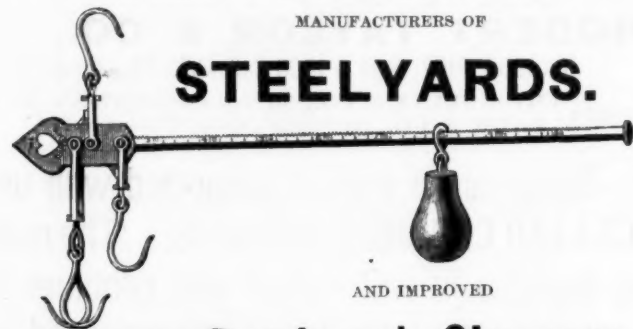
The Hart, Bliven & Mead Mfg. Co.,

18 & 20 Cliff Street, and 243 & 245 Pearl Street, New York.

Factories at KENSINGTON, CONN.

MANUFACTURERS OF

STEELYARDS.



AND IMPROVED

Butchers' Cleavers.



Our Steelyards embrace the English, Collins', Farmers' and the Hart Pattern. All warranted correct.
Our Improved Butchers' Cleavers are made of the best Cast Steel, with strong Norway Iron
Ferrules. Send for our new Catalogue and Price List.

Improved Door Knobs.



On the 10th January, 1865, we obtained Letters Patent for improved method
of securing necks to Mineral and Porcelain Door Knobs, which improve-
ment was used by us long enough to prove its utility, but on account of un-
settled claim of joint ownership by former partner, its use was discontinued.
Having now made a further improvement, for which we have made applica-
tion for a Patent, we are now making the BEST SECURED and MOST
DURABLE Mineral and Porcelain Door Knobs ever offered in this or
other markets.

We solicit orders for these Knobs at our regular prices for old styles, with
the understanding that if any can be loosened from or gotten off the necks
without breaking the tops, they may be held by the purchaser subject to our
order, with expenses added.

See The Iron Age, of August 21st, page 11, for reduced list prices on Locks
and Latches; also, for illustrated description of our patent Telescope
Locks and Latches, with patent Flat Steel Perforated Keys.

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(Corrected weekly by Lloyd, Sipple & Walton).

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 Peter Wright's..... \$ 1 1/2
 Wilkinson's..... \$ 1 1/2
 Eagle..... \$ 1 1/2
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 Discount for 25 dozen lots..... \$ 1 1/2

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Bells—Bevin Bros. Mfg. Co. Full Weight
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 Connell's Door Bells..... \$ 1 1/2
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Ey Pans..... \$ 1 1/2
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Hammers..... \$ 1 1/2
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 Yorkes & Plumb's..... \$ 1 1/2
 Shingling and Half..... \$ 1 1/2

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 Bonney's No. 1 Gate..... \$ 1 1/2

Horse Nails..... \$ 1 1/2
 Assable..... \$ 1 1/2
 Globe..... \$ 1 1/2
 Brundage..... \$ 1 1/2

Putnam..... \$ 1 1/2
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Nov. 2, 1873.

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CLASSES 1, 21, 22,
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MANUFACTURERS OF

Steel Rails, Tyres, Wheels,
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For Tools, Cutlery, Saws, Files, Augers, Gimbets, &c.; Sheet Cast Steel for
SPRINGS AND STAMPING COLD;

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DOG BRAND FILES,

Unsurpassed in quality.

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Warranted Most Superior for Tools and Granite Rock Drills.

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Sole Manufacturers of "CHOICE" Extra Cast Steel.

Manufacturers of all Descriptions of Steel.

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MANUFACTURERS OF THE CELEBRATED

Cast and Double Shear
STEEL,

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Table, Carving,
Butcher and Shoe Knives, Turning Tools, Dies, Files, Clock or other Springs,
Saws and Tools of every variety.

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In calling the attention of consumers of Steel to any of the various above mentioned, we would respectfully assure them of our ability to supply an article, that cannot be equalled in quality, strength, and adaptation in all respects to the various purposes for which it may be required. Half a century of practical experience in all departments of Steel manufacture, a long established reputation in England, and the Continent of Europe, and in the Eastern States principally of this Country, encourage us to solicit a generous trial of our Steel for the above or other purposes for which a first class material in quality, strength, and durability is needed.

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Manufacturers of all descriptions of

STEEL.

Bailey Street and Broad Lane Steel Works, SHEFFIELD, ENGLAND.

Particular attention is paid to quality and temper for

Files, Saws, Table and Pocket Cutlery, Augers, Shovels, &c.

ALSO STEEL of superior quality for Turning Tools, Taps, Dies, Drills, &c.
Hot and Cold Rolled Sheets for Clock Springs, Corset Clasps, Pens, &c.

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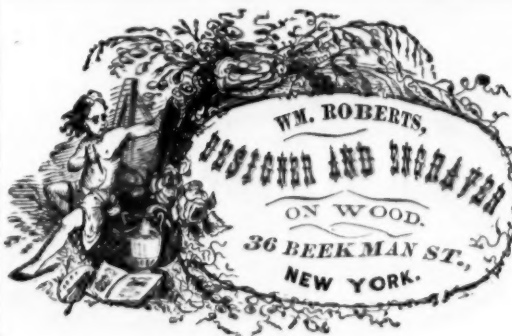
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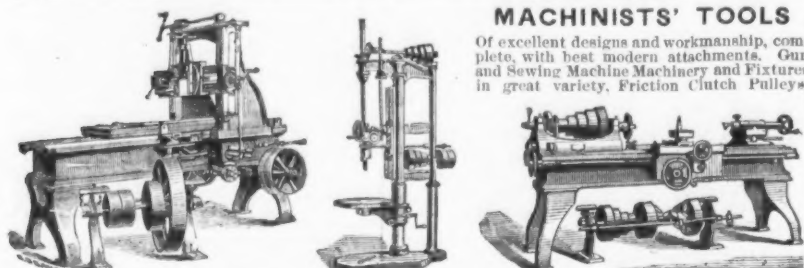
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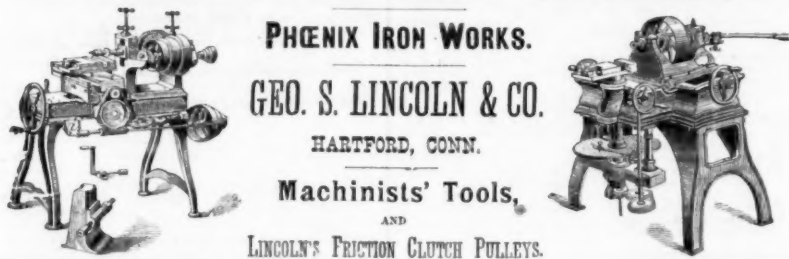
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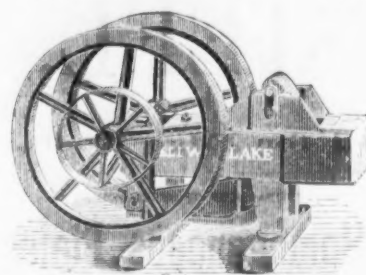
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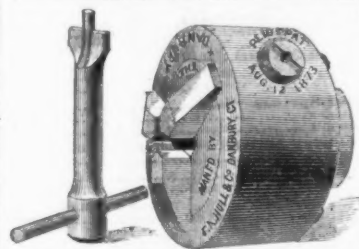
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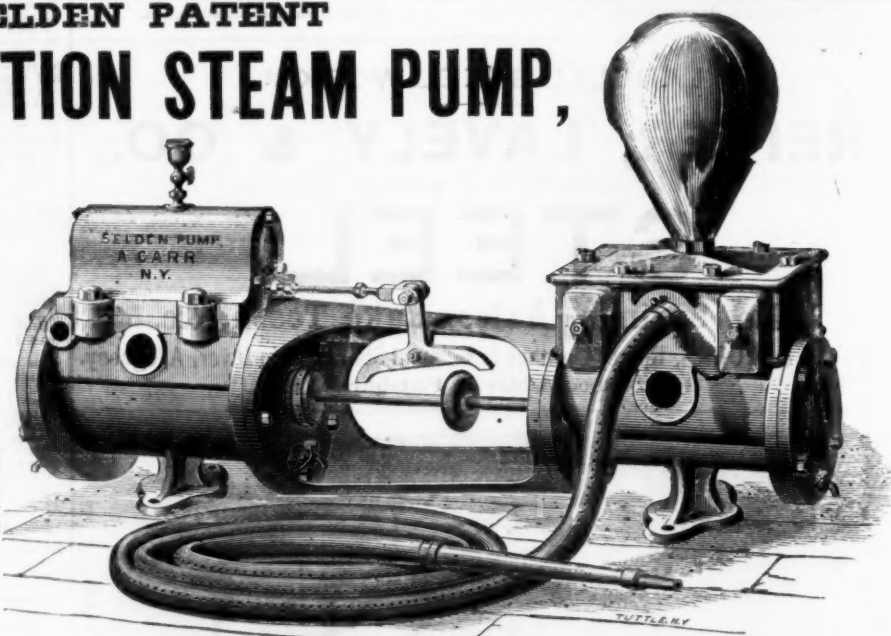
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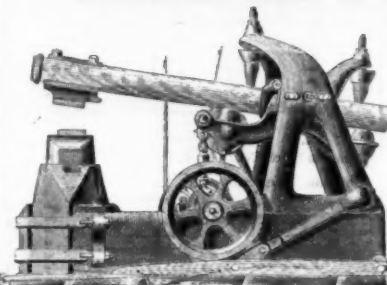
C. H. Reid's Patent, Aug. 12th, 1873.

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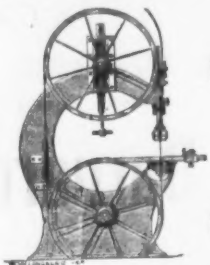
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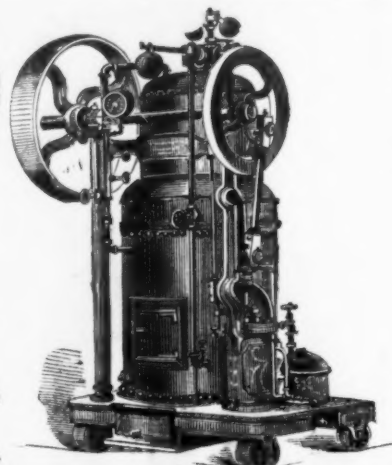
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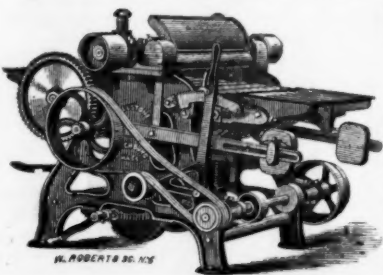
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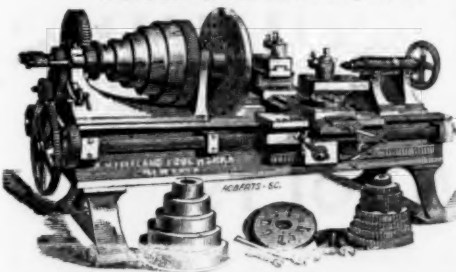
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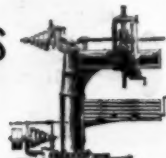
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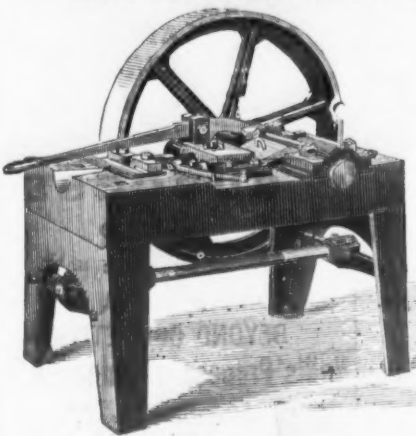
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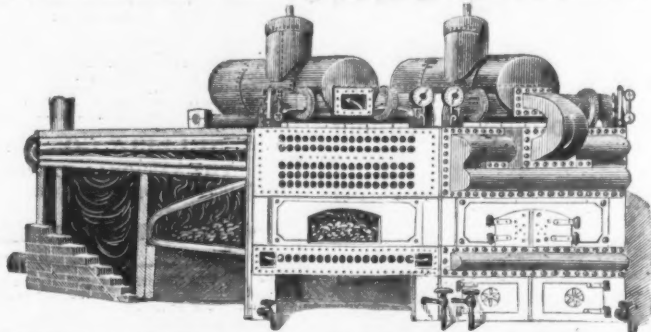
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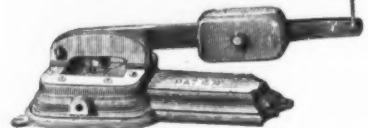
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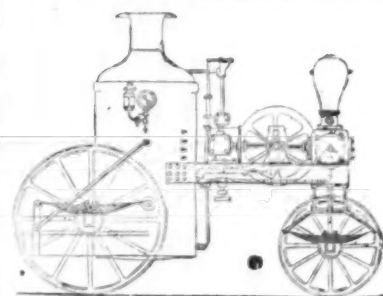
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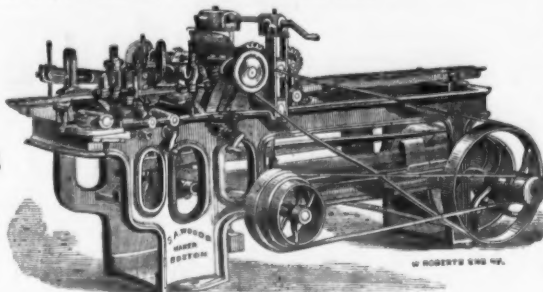
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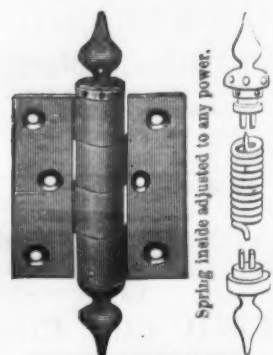
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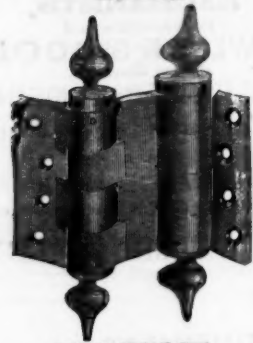
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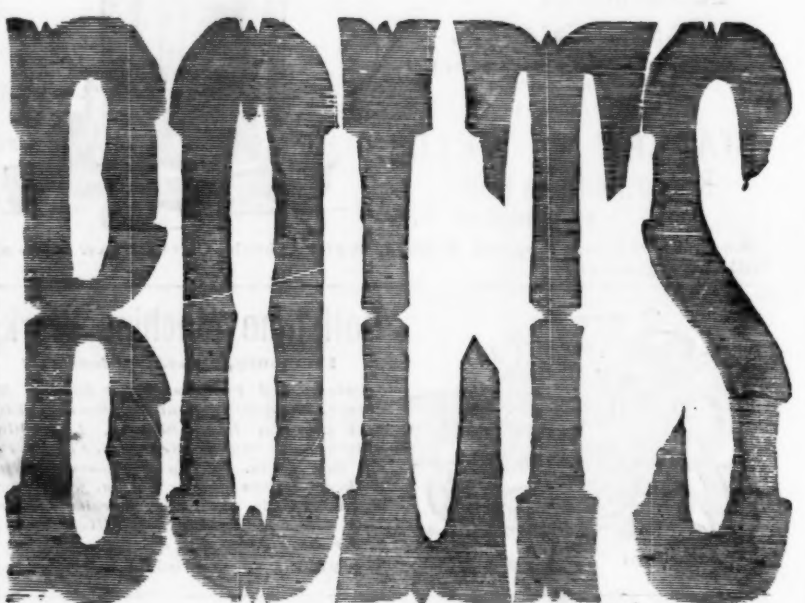
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